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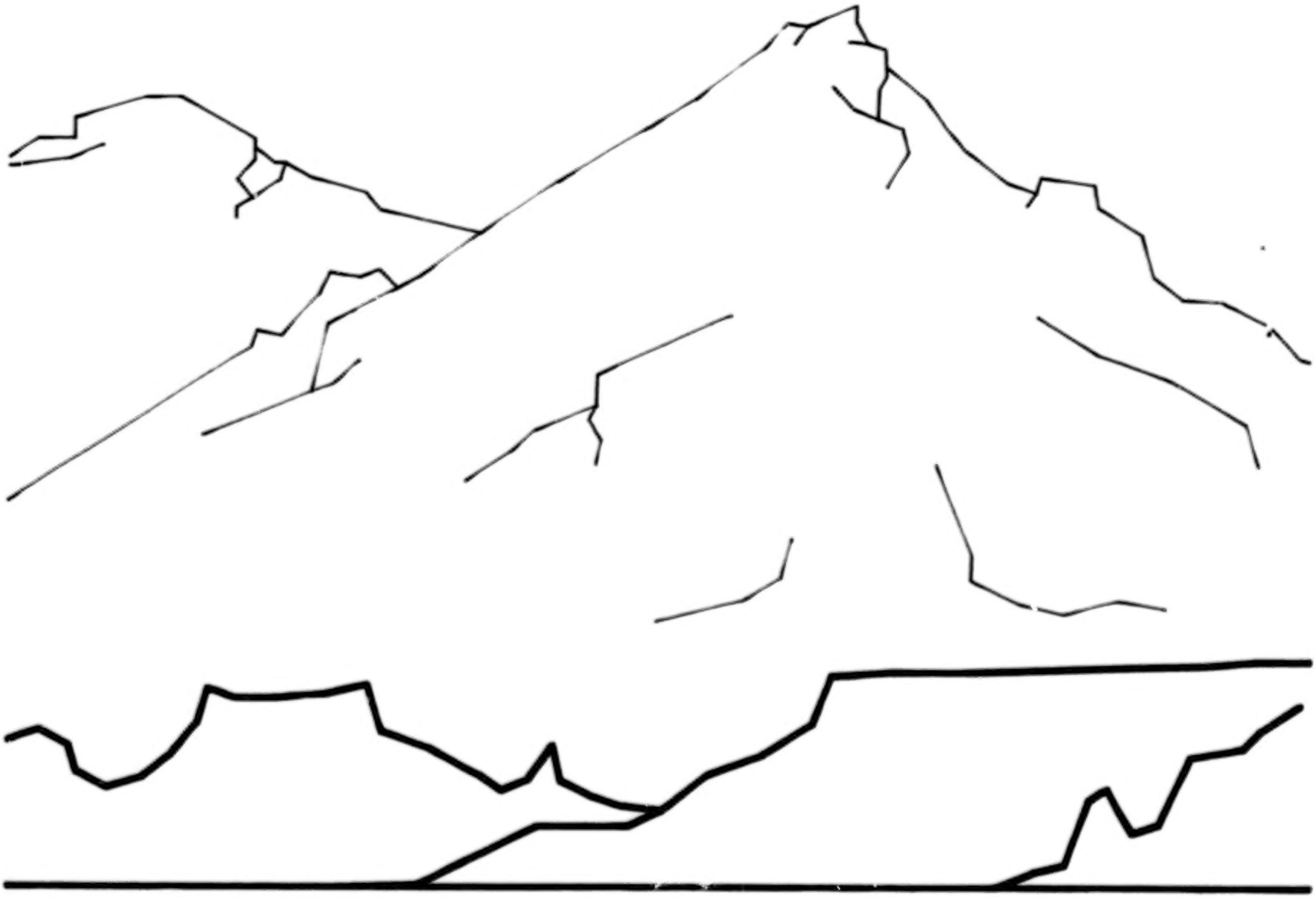
United States Department of the Interior
BUREAU OF LAND MANAGEMENT

RANGELAND MONITORING WORKSHOP PROCEEDINGS



January 12-16, 1987
Golden, Colorado

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PREFACE

Rangeland Monitoring is an integral component of the natural resource management process, particularly within the Grazing Management Program. The Rangeland Monitoring Workshop was convened to provide a forum and means to resolve the major issues affecting rangeland monitoring as conducted by the Bureau of Land Management. As a note to the reader, six work group met prior to the workshop to develop Draft Issue Work Group Reports. These Draft Issue Work Group Reports were revised into final reports as a result of presentations by special interest group representatives, academic representatives, and officials throughout the Bureau of Land Management.

Glen Secrist
Kris Eshelman

Workshop Coordinators

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RANGELAND MONITORING ON THE PUBLIC LANDS

Neil Morck

I guess my interest in Rangeland Monitoring goes back even further than just my most recent assignments. I guess I am the classic in the Bureau who very early learned that the best way to stay ahead of your mistakes is to move fast; I have probably done quite a bit of that. I began my career, doing the Deming 2 Phase and the Parker 3 Step transect, of which we had quite a number and were trying to cover all bands within our districts at least once every 3-5 years. We are probably back almost into that same mode today.

Today we have, of course, a commitment made by the Director and by many of us to do rangeland monitoring and to do it on all of our allotments. I think many of you, too, remember the time when we went to grazing hearings and grazing meetings and our basic tenet was, we were there first with the most, if not the only data on range capacities, range conditions and so forth. We became accustomed to moving forward just based on our judgment, with very little contest from the outside and the using community. That changed in the 1960s for the better when we began to have professional people representing users likewise revealing those conditions and providing countering opinions and judgments to ours; making us take a second look at some of our data.

Needless to say, as we became more involved in rangeland management our programs became more intense. I think we found ourselves looking at more detailed information. We became concerned, in many communities, with statistical reliability and became more scientific perhaps in the analysis and the processes we employed. Of course with each of these comes a heavy commitment in time, and one in which we have found ourselves very concerned as to ability to meet the objective of monitoring all allotments. I think that the premise that we have now in establishing monitoring as the measure of range capacities, is a very positive one.

Again, many of you will recall every time a new issue arose, we did a new range survey and developed a new carrying capacity. Of course, in some cases, we were driven to that by the regulations of that day and, in some cases, we did it because we felt we needed more current data, or were perhaps unwilling to rely on the data that was there from the previous manager or professional people that were involved. Anyway, as we've moved along we have also developed planning objectives for each of our allotments. In many of our preliminary reviews we noted the fact that many of these objectives were providing management goals that were not quantifiable. In many cases, we weren't able to measure our ability to achieve the satisfaction of that objective, and so again we had to take a good hard look and that led us to the conclusion about two years ago that we needed to do an evaluation throughout the field and determine just where we were in the monitoring mode in the Bureau of Land Management.

We also had to recognize the fact that in developing monitoring techniques, we had certain budget constraints. One of the things we had not paid that much attention to, or at least had not been an issue in years previous, was budget. We were dealing in an ever-increasing budget. Our budget was rising throughout the 1970s. We did not encounter great difficulties when it came to gaining manpower, time, and capability to employ particular monitoring techniques and/or to expand them to a number of allotments. As a result, we developed somewhat of a hodgepodge rather than a consistent approach to monitoring. Throughout the Bureau, we have a mixture of intensity as the techniques vary, and perhaps that is not all bad. Certainly, we have become astute enough to realize that monitoring does vary with local conditions, by the ecological circumstances that we happen to be operating in, and likewise, by the community we exist in. Certainly our university systems, extension services, and other agencies have likewise moved down the road of development of range study techniques in given areas, areas that are more understood and better accepted by the local communities, thus perhaps leading us to a conclusion that we should employ those studies that are understandable. One of the things most important to us is to convey an understanding of where we are and what we are attempting to do with

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Neil Morck is Colorado State Director,
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our monitoring program to the public; both those informed and those less informed.

One of the concerns I have had is that we often have developed techniques and studies without particular reason or logic other than the fact that perhaps we have a particular professional who has become enamored either through education or his own interest in a particular approach and thus employs it. Of concern again is the fact that in one district we may employ very intensive techniques and in other districts, a rather broad approach to monitoring; both of them doing the same job, both of them applying to comparable allotments, but no real reason for why one allotment requires a technique so much more intensive than the other.

I think it is important to bring some understanding if not some consistency to the directions we move. We are achieving a variety of levels of accomplishment in our monitoring program. We have some states that are very successful, achieving almost 100% of the job before them. We have other states and districts that are achieving something less than that; some as low as 50%. Our current accomplishments reflect virtually all our identified capability and most of our districts do not have all of their grazing allotments on line yet. Obviously, we need to move rapidly into a program that will enable us to cover all allotments and cover them with a monitoring program that will satisfy our needs, provide us the information necessary to make the decisions that we are after in the five year time frame that we have committed ourselves to. Personally, I think it can be done. I think the evaluation, if nothing else, indicated that it could be done in as much as we find it is being done in some offices. Some of the keys to success that we found were a well understood monitoring program, top management driving the program, participation of other agencies, universities, academia, the various states, and some comprehension and understanding of what that particular program is and what it is attempting to convey.

Perhaps in most of our districts, a broad, or at least a 2 or 3 level, intensity method may be the approach. It is one thing to establish monitoring, and it's one thing to establish plots and be able to return to them. It's another thing to require yourselves to read them every 2 years. This of course is where the professional judgment that we have to develop, or may have already, has to come to play in determining the frequency with which we return to those particular studies. The determination in our minds as professionals where we are at in achieving our goals, we recognize too that some of the techniques that we have employed cannot yield conclusive data we attempt to provide in the decision time (from 3 to 5 years). Much of the range resource we manage will take something like 15 years before a recognizable trend will become apparent. We are expecting too much from the systems we are applying and are reading them too frequently to make them worth our while.

I'm particularly pleased, to see a gathering such as this workshop. It is a good sized group with a cross section of the Bureau. It is only through a forum such as this that I believe we will get the understanding needed to get the job done. Each of you, I would hope, would carry from this workshop some measure of what we are doing; why the techniques must be as they are; why or how we can live with the guidance that we have. Keep in mind, and this is one thing that keeps coming back to me as I talk about budget; that although we have been squeezed for the last several years, we still haven't dropped to the budget level that existed in the 1970s in range. We seemed to get more done then, than now indicating we still have substantial capabilities in the organization. Its a matter of how we apply the dollar, and how we can make the best use of time.

I also think it is important that we come away from this workshop with the appreciation for how the others view us, how those users who are relying upon us to produce some data that they can comprehend, and that we can utilize in making the decisions and making it understandable to them as well as ourselves, and applicable to the broad variety of circumstances. We also have to look at the variety of programs within the Bureau relying upon those same studies, not just range, not just wildlife, but certainly soil, water, and minerals to some degree. I think with that charge, you probably have as much work as anybody is able to handle. I am tickled to see the work groups that are pulled together; I know some of the names from previous work and involvement; an excellent group here representing leadership in a variety of areas.

I was also pleased to note at the top of your program that you have the rodeo tickets as your first order of business. That sets the stage appropriately for the week. It isn't all going to be work; I, like Bob Moore, am very pleased to have you here in Denver. I understand we will have what is called extremely poor air for you today and I know my wife is upset because we won't have a fireplace burning tonight. Those are some of the prices you pay for mountain living anymore. On the East coast we never worried about that.

I hope to be here most of the week following the discussions with considerable interest. I am going to review work groups reports. As I indicated, now that I am State Director of Colorado, I am also interested in how best to implement the program. I think it's fair to say that while our evaluation indicates that Colorado is doing a good job, achieving a satisfactory percent of accomplishment in monitoring (our I allotments are almost completely covered), we do have the problem that I expressed earlier of parallel districts with vastly different standards, one far more manpower intensive than the other, both monitoring comparable resources. One district obviously more costly in time than the other! We are going to have to be able to explain those differences and it is going to have to be explainable from a resource aspect.

With that, I am going to close and wish you the very best throughout the conference. Again, I look forward very much to the results of this deliberating.

RANGELAND MONITORING

Maitland Sharpe

It's a pleasure to be here, and it's something of a surprise as well. Actually, due to some oversight on my part, it wasn't until late Friday afternoon that I realized I was listed as a speaker for this meeting. I am here on short notice because I am convinced that monitoring is critical to the future of the public rangelands, and because this group, people in the room here today, are critical to the success of the Bureau's monitoring efforts. Therefore, this topic and this meeting were too important to pass by.

Monitoring is not a word that stirs the blood or sets the feet tapping. It has not received the public attention from the press, the public at large, or even interest groups like mine, that it should have. In our view, monitoring is in fact the linch pin of range management on the public lands. Since the system of inventories and forage allocation was abandoned, monitoring has been handed the full burden of guiding and supporting the range management decisions. I have been asked to discuss briefly, some of our concerns with respect to monitoring and to outline some recommendations for the Bureau. In doing so, I must start out confessing to you that the list of concerns you are about to hear are based on what may be a somewhat outdated and imperfect view or understanding of what the Bureau has been doing recently with respect to monitoring and evaluation of the monitoring effort. I was very interested in and encouraged by what Neil Morck said just a moment ago. Nevertheless, it may be important to you and to the leaders of the Bureau to understand that there is a lag time here, and that even those of us who think we are watching rather carefully may not fully understand everything that you believe that you are doing in this area.

So what are our concerns as we view BLM's monitoring effort? First, we are concerned that monitoring has not received adequate investments of money and manpower, leading to shortcomings in both quality and quantity. This concern simply reflects what I have heard from the people in the field. I have watched the budget for grazing management decline by 32% in spending power between Fiscal Years 1981 and 1986. I have seen the FTEs in grazing management drop by 25% between 1982 and 1985. I don't have any hard data on the needs, spending, staffing, or the level of effort in the monitoring program per se. What I do know, is that virtually no one outside of the Washington Office of the BLM has ever told me that the monitoring program is adequately funded or staffed. A great many people have told me the opposite. Now I realize of course that the people who work for BLM are accustomed to getting along with too little money and too few personnel. I know that you've raised "making do" to a high art, and that you have managed to find in this a sustaining source of myth and pride within the organization. Even BLM's proven ability to stretch dollars and hours may not be enough to meet the demands of the monitoring jobs unless some additional money and manpower can be found.

Second, we are concerned that the monitoring effort has been less than adequate in scope, size, and frequency. We are concerned that too few allotments have been monitored, and those that have may not have been monitored enough. Over the past few years, only 4,000 to 4,500 out of the more than 26,000 total allotments have been monitored each year according to Bureau budget data. That would mean that not even all of the allotments in the I category, which are after all distinguished by resource conflicts, are receiving annual monitoring. Wayne Burkhardt and others have argued persuasively that at least basic monitoring should be conducted on a yearly basis. We agree. We are persuaded that data on actual use, special events, utilization mapping, climate, and photo plot readings should be gathered for every allotment every year with more detailed transects run at perhaps a 3 year or 5 year interval.

Third, we are concerned that important features of the resource may not be adequately measured in the monitoring process. Many resource values other than forage, especially riparian, wildlife, soil stability, and watershed values are of interests

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Maitland Sharpe is Associate Executive Director, Izaak Walton League of America, Arlington, VA.

to conservationists and many other members of the public. We doubt whether a monitoring system that focuses on utilization of forage species can be relied upon to accurately reflect the condition and trend of these non-forage resources. The relationship between the utilization or trend of key forage species and other multiple use goals seems to be indirect at best. Evidence that an allotment is meeting its utilization goals may indicate, but cannot guarantee, that it is also meeting its goals for soil stability, wildlife habitat, or riparian recovery.

Fourth, we are concerned that the quality of monitoring that has been done has been uneven, and in some cases, less than adequate. The 1984 assessment of the monitoring program in Utah was a laudable exercise in self examination from a state that seems to have taken its monitoring responsibilities extraordinarily seriously. It is encouraging that the review team found the general health of the range monitoring effort in Utah "relatively good." The review team also found numerous deficiencies in the program including some they felt could leave the agency without sufficient data on which to base management decisions. Problems cited in the Utah study included widespread failure to integrate wildlife habitat and watershed objectives into range monitoring plans, chronic lack of manpower, inconsistencies in field methods and record keeping, and a very serious, potentially crippling lack of utilization maps. They also found the basic monitoring studies such as actual use, trend, utilization, and climate, had not been conducted on all allotments with serious resource conflicts. So "as a result there will not be enough data upon which to base management decisions."

Fifth, we are concerned that BLM's people in the field, yourselves, and people who work for you, may not have received, at least prior to this meeting, a clear message that the Bureau's top leadership in Washington views monitoring as a top priority for the agency. It is important the BLM field offices here, along with the Bureau's top leaders, are dead serious about the monitoring program. That they are committed to securing the money and the manpower needed for monitoring, they expect monitoring data to be used in making management decisions. and they will stand behind grazing decisions made on the basis of monitoring the results. The Utah report found "a general lack of confidence among Utah BLM staff that the monitoring data being gathered can or will be used by managers to make resource management decisions." That is a shocking and distressing finding. Clearly, if the people in the field believe that monitoring is a sterile, empty exercise, monitoring is not going to win their best efforts. The data, as a result, may not be able to support decisions and that means the system of professional range management based on monitoring data may simply fail.

Sixth, we are concerned that it has been impossible for the public, or for that matter, the Congress, to assess the adequacy of BLM's overall monitoring efforts. BLM has had no agencywide prescription for monitoring requirements as Neil just discussed. The individual state and district offices have been responsible for detailing how monitoring is to be accomplished and the procedures have varied widely. There has been no agencywide compilation of what is being accomplished or how it is being accomplished in the monitoring arena. BLM headquarters, thus, cannot know what monitoring is being conducted to support the management decisions the agency needs to make in the near future. Nor has congress or those of us who are interested observers been able to know that.

Finally, we are concerned that the monitoring program has had such a low profile that it has been practically invisible. There has been little public awareness and less public participation. As a result, many observers question the adequacy of the monitoring effort and many of them are predisposed to question the results. This situation could lead to problems in the near future. Few people may care about monitoring, per se, but a great many will care intensely about the grazing decisions to which monitoring should lead. If those decisions are to be accepted by the public, particularly if they seem to violate the public's expectations about what is out there or the conditions and the needs of the public lands, then people must have a high level of confidence that the underlying monitoring work has been done and the results are real and are right.

If those are our concerns, what are our prescriptions? First, and perhaps most obvious, is to capture more money and manpower to devote to the monitoring task. That is a job for the Bureau's Washington Office and for groups like my own that have a stake in the outcome. Parenthetically, more detailed information on the problems you've experienced in doing monitoring on your personnel and dollar needs would be exceedingly useful in that effort. As I noted earlier, I realize that BLM thrives on adversity, and I wouldn't want to do anything to threaten you and your morale or security by beefing up the monitoring program to the point that it became easy or even doable. That, I realize, would be too much to ask. Seriously, we all know realistically, the best we can hope for is some modest transfer of funds from other programs perhaps, and a slight increase in appropriations. Even that will be exceedingly difficult to achieve. So with that in mind I would urge you all to try and tailor or continue to tailor your monitoring efforts to the funding and personnel constraints and the realities imposed by the field conditions that you and your people face.

To succeed under those conditions, monitoring in our view has to be simple, reliable, sturdy, and resilient. It has to be tailored to the abilities of some of your least experienced employees, it must be understandable to members of the public and to judges who are not versed in range science. Also, it must be and appear to be objective so the results will be accepted by the public and the courts. We think a simple system of annual monitoring including photo records, utilization maps, monitoring conducted by BLM personnel with the permittee, if possible, and supplemented by more detailed transect readings at a longer interval offers a serviceable system. We think it is reasonable and prudent to give up a degree of methodological elegance or theoretical power for something that is cheap and reliable and that works under field conditions (sort of a Model T or a pickup instead of a Porsche.) Monitoring, as we see it, should be a tool for management and not a substitute. We do not expect and we do not want a strict mechanistic system in which management decisions are dictated by the data, a sort of management by the numbers approach. We do expect that monitoring will produce enough information about conditions and trends that the manager can make sound decisions based on his best professional judgment. The data available will enable managers to make those decisions in the here and now, make them stick, and get on with the business of managing the public rangelands.

Second, we would urge the Bureau to try to expand both the scope of monitoring so that more allotments are being monitored, In that regard, I was very glad to hear Neil's comment this morning referring to the committment by the Bureau to bring all allotments under monitoring in the relatively near future. In any case, we believe that all allotments should be monitored and we would also urge you to increase the frequency of monitoring so that the monitoring record includes an annual record of observations. We realize again, that won't be easy given the funding and personnel constraints you face and is one of the reasons we see a need for increased funding and staffing. Nevertheless, we believe all allotments should be placed under a monitoring program with levels of intensity varying according to or reflecting resource conflicts. At a minimum we think that all category I allotments should be intensively monitored at this time and a clear schedule established for promptly extending monitoring to all allotments in the other two categories.

Third, we recommend that BLM try to make the range monitoring system more sensitive to wildlife, riparian, soil, and watershed values through a system of integrated monitoring. Again, additional money and manpower would be required. Sound defensible range management decisions demand good information on all aspects of the rangeland resource and on progress towards the full array of management objectives. That information can be gathered most efficiently by folding wildlife habitat, riparian, soils, and other such measurements into a single integrated range monitoring system.

Fourth, we would urge the Bureau at all levels to pay close attention to quality control recognizing that it will be an unending, largely thankless, but essential feature of the monitoring process. As was noted in the Utah report, monitoring results that are vulnerable to challenge because they are sloppy, inconsistent, or incomplete may be unable to bear the burden of supporting the needed management decisions. As a start we would urge each state to take a critical evaluation modeled at least in spirit after the Utah report of your own monitoring efforts if you have not already done so.

Fifth, to make sure the entire Bureau understands the importance of the monitoring program and shares a committment to making it work, we would urge that a strong, clear, unmistakable message be issued from the top stating that monitoring is a priority and that the results will be used. The message from Washington should be amplified and confirmed by concrete actions demonstrating the committment. Actions including seeking increased funding and manpower, using monitoring results to render grazing decisions, and as recommended in the Utah report again, rewarding personnel that perform well in the monitoring effort.

Sixth, we would urge BLM to issue umbrella guidelines or standards for the design and conduct of monitoring programs. In our view, those should include requirements for periodic critical assessments at state and national levels and regular reporting of the status of the monitoring effort probably on a district basis. Reporting could cover such things as how many allotments are being monitored, for what, how often, the problems experienced, the costs in dollars and staff time consumed, and the decisions rendered based on the monitoring data.

Seventh, to raise the visibility of the monitoring program, the Bureau could try any of a number of rather obvious tactics. Such things as trying to seek an even greater involvement of extension, more outreach to the media, working field trips so selected interested media people and a few conservationists can get out there and actually see monitoring being done. Another suggestion is conducting weekend workshops closer to urban centers, run by extension people designed to convey some understanding of how monitoring is done and even more than that an understanding of what it is and why it is important. Finally, a renewed effort to involve even more of the permittees. I recognize all of that is going to be difficult, and it may not work. It is hard to get people out into the field, it is hard to get people to meetings; distances are great, interest is often lacking, but I think it is worth a try because anything that can be done now to increase public understanding, awareness, and appreciation of the monitoring that is going on could go a long way towards limiting conflicts over range management decisions in the near future.

Finally, I would urge the Bureau to plan for a sustained ongoing monitoring effort. I would hope you could build on your experience, perfect the monitoring process, and build it into the ongoing range managements system as a central and permanent feature. Range management is never done, it must be constantly repeated over time. The information base that directs range management decisions, which is acquired through monitoring, must be continuously renewed as well. In my view, monitoring offers a chance for public range management to progress towards a continuous relatively smooth cycle of measurement, feedback, further adjustment, and a constant tailoring to the changing local realities of a dynamic resource. By the same token, it may offer a way out of our unfortunate pattern of grazing management in which long periods of uneasy stalemate are punctuated by great exciting spasms of open conflict. It seems clear to me that an ongoing system of incremental adjustment would be a major improvement for the users, the managers, and the resource base itself. Though undoubtedly, it would be less exciting.

To summarize then, we see monitoring as the linch pin of range management. It is essential that monitoring be done and that it be done well. To that end, it is important to increase the committment to monitoring in dollars and personnel, in leadership, and in quality control. It is important to expand monitoring in scope and frequency and to integrate wildlife, riparian, and other values so that the manager gets a balanced picture of the entire resource. It is important that monitoring be simple, serviceable, adapted to field conditions, and that it be visible and credible to all of the interests that will have a stake in the decisions. It is important that the monitoring program be continued as the central feature of an ongoing range management effort system based on continuous feedback and adjustment.

Finally, it is essential, that the Bureau find the confidence, and the political will to begin to issue management decisions based on the monitoring of the past 5 years. The public rangelands are in need of range management. Management decisions will be made, if not by range professionals on the basis of monitoring data, then by the courts. That is an outcome that I think no one in this room would like to see.

MONITORING - IMPORTANCE AND PURPOSE

Bud Eppers

I concur with Maitland Sharpe on many of his comments. I think we find in many respects, that the livestock industry and the environmental groups are closely aligned on some of the serious problems that have faced the public land managers over the past number of years.

Having come from Southeastern New Mexico, in an area highly improved over time by range improvements, management of livestock, and grazing procedures, I felt like the entire world was like this. But, as I get out and start traveling around to other areas I find that this is not necessarily the situation.

When monitoring first became an issue of importance a few years back, (having gone through the early stages of the SVIM (Soil Vegetation Inventory Method) method of analyzing range conditions, there was no doubt in the livestock industry's mind that there had to be a different and better way to be able to evaluate not only what existed on the rangelands but what we were doing with the resources that we had. So when monitoring began to surface, I know in our part of the country and a few other states, the livestock industry was very intent in trying to get in on the early phases of monitoring and to help develop the techniques. In New Mexico, the BLM worked with the university system, the various departments within state, the Soil Conservation Service, the grazing advisory boards, and the permittees in developing the procedures that would be used in New Mexico. The Bureau of Land Management set up many of the early meetings and informed the people of the procedures that had been discussed and worked out with the academic community and others listed above.

The ranchers in attendance were given the opportunity to go out and follow step by step the monitoring techniques that had been developed for the various allotments. I think in our part of the country, one of the basic things that has expedited the monitoring system is the communication that has developed between the range conservationists and the livestock industry. Everybody had the opportunity to see what was transpiring, and what the Bureau personnel were looking at. Although we in the ranching business think we have improved the rangeland over many years, we now have had the opportunity to go out with the "range cons" and converse with them, sharing ideas, sharing what we were seeing on the range, and had a better understanding throughout the process than we ever did of what rangeland conditions truly were as measured scientifically.

The ranchers were asked early on to go out with the personnel to establish the permanent location sites that the transects for the monitoring period would be run from. These sites had to be located close enough to water, but yet far enough from water to where you don't have the intensive impact of the sacrifice areas around the limited water supplies that you have in some of the areas. Ranchers were invited to walk every foot of the original transects that were set up to establish the categorization process that the Bureau initiated. There again, the involvement and communication were two of the most important aspects of the monitoring program in our area that helped expedite and give the feeling of security to the ranchers as well as Bureau personnel.

This spring, in our area, we will end 5 years of monitoring. For the most part, it has been an enjoyable experience for the majority of us that have been out on the range with the personnel and viewed first hand just what was actually occurring. I've had a number of ranchers tell us over the years that they didn't have time to go out and monitor with the agency people, in turn, I've told the ranchers if they didn't have time to go, not to come back to us arguing that the information they have collected is not relevant and that livestock adjustments either way are not warranted. We have to have the communication with Bureau personnel. I would hope that in areas in which this is not in practice today, that you can develop that communication with the permittees. Let them know that you are coming. Surely you should know a few days before your going out on one of these allotments. I think

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Bud Eppers is Vice President,
Public Lands Council, Roswell, NM.

that the Bureau should be responsible in informing the permittee that they are going to be there, why they are going to be there, and ask the permittee to join you.

I can't emphasize the importance of monitoring. It is the only way that we can accumulate the necessary data that will help us to set management perogatives in the future and to set livestock carrying capacities through the readjudication of the range.

We have all kinds of support for our Bureau people in Southeastern New Mexico I'm very proud of them and I am very proud of the livestock people who participate. I just can't say enough about the need to communicate and work together. I would also like to extend an invitation to Maitland Sharpe to visit Roswell at anytime so that he could see what we have going on in our district. A lot of people outside of the area don't have the opportunity, many times, to review or witness what is going on on the land.

I cannot express the importance of monitoring, and the support the industry has for monitoring. I think that we need a simple method that does not complicate the situation where Bureau personnel, the livestock industry, or the special interest groups are not aware of what we are doing. I would only hope that we could get on with this process at a more rapid pace throughout the west and hopefully accomplish the job before us.

I would disagree with Maitland in respect to having more money or more personnel to do the job. I don't think we have had more money in New Mexico, I don't think that we have more range cons in New Mexico than the other states, but we have developed a technique to where we can go out and accomplish the tasks with the funds and the personnel on board. I think that if we can do it there, it can be done in the other districts as well. We have seen many times over the years, a big influx of money to try to resolve rangeland problems. I don't think it's necessary to try to drown a problem with money when a more thorough understanding of the problem and a basic agreement between those parties involved in the resolution can be accomplished without additional funds. With that I will close and respond to any questions.

MONITORING-PERFORMANCE TESTING OF RANGELAND RESOURCES AND MANAGEMENT

F. E. Busby

Rangeland monitoring is done to determine what is happening to an area of land and its soil, plant, water, animal, and other resources over a period of time. To be most valuable, predetermined objectives should be established and the monitoring program should be conducted to see if the objectives are being accomplished. Possible objectives of range monitoring will be discussed later in this paper. Before discussing monitoring objectives, however, I would like to compare rangeland monitoring to performance testing of livestock. I make this comparison for two reasons:

1. As indicated in the title of this paper, I believe that monitoring is the equivalent of performance testing of rangeland resources and management.

2. I believe that one of the key audiences of the monitoring program is the rancher. Therefore, it is important that we develop a way of explaining monitoring in terms that a rancher understands. Since performance testing of livestock is a well-accepted practice, this analogy may aid us in communicating with the livestock operator.

Performance testing measures specific heritable traits of animals with the decision to "keep or cull" an animal based on whether the animal performs in the predetermined manner. Offspring of breeding females that meet the management objective are kept for replacement purposes perpetuating the desirable heritable characteristics in the herd. Some common performance testing objectives for range livestock operations are listed below. (The performance testing objectives listed concentrate on improving the breeding female portion of the herd. Prior to initiating any of these activities, it is important to test the males for fertility and ability to breed, and both the males and females for disease. Improved performance objectives can't be accomplished if factors that limit positive response to management are present. Also, as improvement is made in the breeding herd it is important to improve the genetic potential of the herd by purchasing better quality males.)

1. Pregnancy Testing. Following the breeding period several things can happen to end a pregnancy, or the female may not have been bred in the first place. Pregnancy testing identifies females that are not pregnant. Such animals are
sold. In a few years the breeding herd is composed of animals with a high tendency to conceive and carry the fetus to birth.

2. Date of Breeding. It is important for many management reasons for the females to be bred within a given period of time. Females that do not breed within the defined breeding season are sold. Within a short period of time late breeding females can be eliminated from the herd.

3. Offspring Weaned. The ability to raise newborn to weaning is necessary if livestock production is going to be profitable. By culling females that lose offspring between birth and weaning a breeding herd with improved mothering ability can be developed.

4. Weaning Weight: Higher weaning weights indicate improved mothering ability of the female and/or differences in growth potential of the offspring. Both are desirable performance characteristics which can be selected for by selling females that produce lighter weight offspring.

5. Multiple Births. Giving birth to twins or even triplets is largely genetically controlled. By identifying females that give birth to twins or triplets and that successfully raise the offspring to weaning, a breeding herd with a tendency for multiple births can be developed.

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Table 1 illustrates a management chart that can be used to guide the performance testing program by filling in the blank cells.

A performance testing program should start by addressing the problem that will be addressing the problem that will be the easiest to correct and which will have a high payoff. In the list of objectives discussed above, pregnancy testing probably offers the best approach for a high percentage of his females testing pregnant, then attention can be placed on the breeding season and on the number of offspring weaned. Finally, efforts to increase the weaning weights can be implemented. These four objectives probably form the basic performance testing program for most ranchers. The multiple births objective is included as an example of how a rancher can add to a basic performance testing program to meet individual ranch goals.

To review, let's examine the key points of a successful livestock performance testing program and relate them to a rangeland monitoring program.

1. Before a performance testing program is initiated, limiting factors such as disease and infertility must be determined and treated. In a rangeland monitoring program, limiting factors such as soil type, precipitation, topography, and other natural components of the environment must be well-understood. A range management program that ignores the inherent potential of the landscape is doomed to failure and the monitoring program will just document the failure.

2. The characteristic to be tested is predictable from known aspects of animal genetics. Before we implement a program to change some thing and measure the change we must

	% Calving Pregnant	% Offspring Born Before / /	% Weaned	Average Weaning Weight	% Multiple Births
Where Are You Now?					
Where Do You Want To Be? (Goals)					
Major Problems to Overcome?					
Plan To Correct Problem?					
Expected Return If Goal Is Achieved?					

Table 1. Performance Testing Management Chart.

be able to predict that an action will yield a given result. A successful rangeland monitoring program must be based on the predictability of how a management action will affect the range resource. Range managers use their knowledge of ecology to predict results of management actions.

3. Performance testing programs are based on objectives to be achieved. Data are not gathered just for the sake of collecting information. If we need a national data base of range condition information, then a sampling scheme to gather such information should be established. But such an effort should be a statistically designed study to determine long term national averages. Such an effort would not be used to make management decisions on particular areas of land. I believe that a rangeland monitoring program should be part of an action program designed to change range condition in some predetermined manner or maintain current condition for a predetermined reason. The purpose of a rangeland monitoring program should be to measure whether management objectives are being met.

4. In a performance testing program the herd performance characteristics to be addressed are defined, but the treatments are applied to the individual animal. In other words, when a lower than desired pregnancy rate for the herd is determined to be the problem, individual animals are tested and open females are sold. In a rangeland monitoring program, we must have overall objectives for an area of land, but management treatments must be developed and applied for individual range sites and monitoring of results must also be done on individual range sites.

5. A livestock performance testing program relies on different techniques to measure different performance traits. Pregnancy testing will not provide useful data on weaning weights. The measurement techniques called for in a rangeland monitoring program must be chosen because they will properly and efficiently measure the rangeland trait being tested.

6. Sometimes you must solve one problem before you can solve other problems. Therefore, in both livestock management and range management programs, and the accompanying performance testing or monitoring programs, it is important to address problems that can be solved and will provide a reasonable economic return for the effort. As progress is made other opportunities for advancement may become possible.

7. A livestock performance testing program ties action and data gathering together to accomplish the goals. For instance, in a pregnancy testing program the purpose is to determine through measurements which females are pregnant. The action to sell all open females has already been determined so the measurement results in the herd performance being improved. A rangeland monitoring program should also be closely tied to the action program. For instance, monitoring should determine if a grazing system is affecting the range in the predicted manner of if sagebrush spraying has caused the predetermined change in the plant community.

Some rangeland characteristics that may need to be monitored are:

1. Amount of total plant production.

2. Amount of production of certain plant species.

3. Amount of plant cover.

4. Decrease or increase of desirable or undesirable plants.

5. Erosion.

6. Utilization by grazing animals.

7. Range condition.

I won't discuss these because I think most range managers know what I mean with each of these terms. Whatever the range manager chooses to monitor, the following questions should be considered:

1. What is the current situation?

2. What is the desired situation?

3. What is the recommended action to achieve the desired situation?

4. What is the critical rangeland characteristic to be measured?

5. What is the expected result if objective is accomplished?

Table 2 illustrates a management chart that can be used to guide the range measurement and monitoring program by filling in the blank cells.

In summary, rangeland monitoring and livestock performance testing are similar in many ways. When properly utilized, both can contribute to improved management of ranch resources. When improperly used, however, the result may be the collection of data that are of little value. The Society for Range Management strongly encourages the Bureau of Land Management to proceed with the development and implementation of a rangeland monitoring program that will contribute to better rangeland management and the documentation of the positive effects of such a program.

	Total Plant Production lbs.	Total Plant Cover	Undesirable Plants %	Range Condition	Utilization
Current Situation?					
Desired Situation?					
Recommended Action?					
Characteristic to be measured?					
Measurement Technique?					
Expected Result?					

Table 2. Rangeland Monitoring Management Chart.

RANGELAND MONITORING

Henry Smith

I don't think that there is any question, but let me say it one more time, monitoring is the Director's priority. When I first came on board, the Director emphasized to me that we are a multiple use agency. Multiple use is the greatest thing that we have going for us. Further, he stressed that we need to reaffirm and emphasize our multiple use mission at every opportunity and to get out and demonstrate that ethic in our day to day management. An important element of multiple use management or multiple use, is monitoring. Some even view it as the cornerstone of multiple use management.

The Director affirmed his interests and views with the first charge that he gave me. That was to look into the grazing monitoring program to be sure that we are complying with our policy. We immediately launched that effort and over the past 6 months have sought to clarify the policy and focus the attention of the Bureau management team and the field people on this initiative. Today I am only going to focus on rangeland monitoring, but the other aspects of monitoring are just as important. While much is being done, much more needs to be done to make monitoring more cost effective and efficient and to ensure that we have the adequate data to make the management decisions within the 5 years after the issuance of the Environmental Impact Statement.

In Fiscal Year 1986 we spent 3.6 million dollars for rangeland monitoring, in Fiscal Year 1987 we have added 1.5 million dollars because we are nearly doubling the number of M and I category allotments that we have to monitor. There may be a short fall however, the cost per allotment is too high and in some instances we are just collecting too much data. We need to look at ways of bringing those costs down. Our policy is to monitor all allotments, but we need not do it at the same intensity for each and every allotment. More over, we need to become more selective with intensive monitoring even within the I category.

We are all familiar with the policy, but let me just quickly recap it for you. Briefly, the policy states grazing preference adjustments either up or down shall be based on monitoring, or a combination of monitoring and inventory. It shall not be based solely on vegetation production. The intent of monitoring is to evaluate our management efforts relative to the objectives outlined in the applicable land use plan or the range program summary. With good objectives and a conscientious effort to do timely monitoring, it will give us a reasonable assessment of whether we are meeting those objectives, including the establishment or the validation of stocking levels in 5 years. That's our goal. If your state's supplemental guidance does not make that clear, than it needs to be changed.

Of course monitoring doesn't end at the end of 5 years. It's a continuing ongoing effort. Nor is monitoring to be considered the end product, rather it is the means to the end and the end product is a balanced multiple use management of our public lands. Further, as part of that effort, I cannot emphasize enough the three C's, Consultation, Coordination, and Cooperation with affected interests. Affected interests need to be involved not only in analyzing the results but in the planning and in carrying out the total program.

This workshop today is a continuing part of their involvement and certainly I ask Bud and Maitland to carry back to their constituents that we want and encourage their involvement and their help. It's a big job that we have before us, and during this week I hope that we will look at what progress we have made, where we need to improve, and whether we need to further clarify and strengthen our policy on techniques to get the job done. The purpose of this workshop is to share ideas. If each of us just share one idea--
I think this workshop will be a success.

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MONITORING IS MANAGEMENT

David P. Tidwell

The Director certainly gives monitoring the Bureau's highest priority. That carries on throughout the department. We really need to make that committment known, and I think that we have already had some excellent speeches this morning to clearly define that.

The comments that I am going to make are directed in general to the Bureau. I know many of you have developed excellent participative management programs, but regularly we learn of problems in cooperation and communication. I'm going to try to address those, and give you a little case study that might be interesting.

We stressed participation mostly by ranchers in rangeland monitoring, but there are people in this room who are responsible for involving a wide spectrum of public participation. I would encourage you to visit with them if you have any question as to how to get people, other than ranchers, involved in your management and monitoring programs. I will just mention a few, and some of the things that they have done, that might be of interest to you. For example, there is Bill Phillips and Lee Delaney, of the Modac Washoe Experimental Stewardship Program, and they have developed a process called technical review teams that all of you need to learn something about. It is one the most exciting processes I have seen, and you should take advantage of that. Jim Hancock, over in Prineville, has a group of livestock people and environmental groups working actively right now in dealing with riparian management. Their accomplishments in just a very short time are impressive. Joe Zimmer, is a master at putting people together with widely diverse viewpoints, and certainly has some ideas I know you would certainly be interested in; Billy Templeton, before he left the Arizona Strip, entered into one of the most noteworthy accomplishments, as far as wilderness is concerned. That was the Arizona Strip Wilderness Program that has already been enacted into law and that covered a very wide variety of organizations. There are many others of you that I know have done those kinds of things very successfully. The only comment I can make is, "Don't make that one fatal mistake of excluding anyone who wants to be involved in resource management."

I'm in a rather fortunate position this morning in having been able to listen to 5 or 6 previous speakers, and gather their wisdom along with what I had already planned to discuss. Just one word of clarification, that in my comments, all the principles that F.E. Busby mentioned are to be applied to my comments. That was a good presentation, particularly in his equation of range management to production testing of livestock. My comments are intended to emphasize and encourage participative monitoring in management.

We in the Bureau are usually well grounded through education in a specific discipline. However, in most instances, we have had to develop our human relation skills on our own. In the position I serve in, I probably hear more complaints about Bureau actions reduced to a level of personality conflicts than almost anyone. They come from Congressional offices, industry, other agencies, and interest groups. In virtually every case, the issue could have been avoided through better communication skills. In every case communication skills were the means used to ultimately resolve the issues. So it's only logical to conclude that we should be using communication skills to avoid some of the problems that we face.

You might ask, "Where does monitoring enter into this discussion?" My observations, over more years than I like to admit, have taught me that monitoring is one of the best communication tools we have in range management. Everyone, permittees, state wildlife biologists, and conservationists are interested in what is happening on the range. It's an educational opportunity for all parties. All people can see the same things and can offer their interpretations. They don't always have to agree

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to begin with, but if there's an honest exchange, a foundation of trust that can lead to exciting opportunities is established.

Before I give you a brief case study to illustrate how communications through monitoring can be effective toward improving working relations, I want to make a point as to the role of monitoring in resource management. Monitoring is management. It can't be separated from day to day allotment activities. Monitoring must be performed by the person who is going to be making the management decisions. Simple observations of animal use patterns, climate, plant phenology, wildlife use, and animal behavior are monitoring activities.

The more formal utilization studies and data recording can also be done as the permittee and "range con" carry out their allotment reviews. The monitoring information provides you, and the other interests in the allotment, clues as to which direction current management is taking, and what if any adjustment is required. The interpretation of the information, best in an on-the-ground discussion with the permittee and other interested parties, will lead to management decisions for the next season.

As you can see, monitoring is management. Armed with mutual information from studies and observations, the Bureau can determine use levels, seasons, and location, whereas the permittee can plan his next grazing season both on his private land, and on the public lands. Mutual decisions can be made on how to deal with unusual circumstances. Best of all, a relationship based on mutual trust can be established.

I would like to give you a rundown on an actual grazing situation that began in the 1970s in Idaho when I was with the university, and the role monitoring has played in conflict resolution and the development of mutual trust between BLM, the permittee, and other federal and state agencies. First I will give you a little background. In this particular area, livestock operators from the county cattlemens association, had demonstrated a willingness to work cooperatively with the Bureau since the early 60s. A Vale Project approach to development had been pursued and some Congressional action was attempted but never quite accomplished. There had been some success as far as individual operations, but not in any overall pattern. The Bureau, the rancher, and the state agency relationships were generally good. Regular coordination meetings were conducted, and this continued through 1977.

Then the Bureau became embroiled in the MFP and EIS process, didn't do as much consultation as they had been doing in the past, then suddenly released the MFP forage production information. Well all hell broke loose. There was a meeting in the courthouse, standing room only, probably 250 people, and everyone was shouting war. An action committee was formed in October of 78, and that committee was devised by the multitude to plot a battle plan. Fortunately, there were a few cool heads on that committee that had other plans. They persuaded the committee to explore a more positive approach. Rather than becoming embroiled in lengthy counterproductive appeals, they wanted to come up with a better idea. It took seven months of meeting by this group, generally 2-4 nights per week, before tensions had subsided enough that we could get the district manager and the area manager in the same room with that committee. (The other 225 were still mad.) But we made a lot of progress, and a new alternative to the EIS was developed which provided participation in management and improvement by the permittees, the state land and wildlife agencies, the Soil Conservation Service, and conservation organizations.

The cooperative alternative became the proposed action plan. The permittees agreed to maintain grazing utilization at or below certain levels. The first efforts by BLM "range cons" was to establish a Coordinated Resource Management Plan that incorporated all federal, state, and private land, and included the state wildlife agency. To begin this, some selected allotments were identified, with a cooperative permittee and a good mix of land ownerships and interests. The first step was to have a tour of this allotment, which then was repeated each time people came on board. The tour accomplished three things, all parties were provided training, key species identification, management objectives were established, and key area selection. They also received training in estimating utilization levels and they identified opportunities on non-federal lands for improving management on federal lands.

The field trips were continued on a few demonstration allotments selected on the basis of the willingness of the operator. Some of the permittees became so satisfied and enthused about this that, they volunteered to promote the program at local, state, and national range workshops and symposia at their own expense. The monitoring program that required in this instance, nc more than 50% utilization of key species, dramatically improved the management abilities of the permittees. They started out strictly adhering to that 50% utilization, and as a result some pastures were grazed too late and they realized that they had to look at the phenology. Over the period of 2 or 3 years, they became pretty sharp at addressing the relationships between seasons of grazing and the utilization levels on specific species. The workload on the "range cons" became considerably less as these people assumed more responsibility for the care of the range in their allotments. Other permittees then observed the improvement in both the range and livestock.

Eventually, out of approximately 80 permittees, all but 3 entered into this program. Less than 2 years ago, 2 of the 3 called up with their hat in their hand and wondered if it was too late to join. We pointed out that it was not to late to join, but that they may not achieve the same level of benefit and improvement that the ones that joined earlier would, but we certainly would welcome them. So at this point, to my knowledge, there is only one permittee who has still not come on board. He will probably face the reductions that the inventory originally called for and in that particular resource area, they are in the neighborhood of 70%.

But the basic training, simple range management principles, monitoring techniques, and the joint application of that information, was the key element in developing a lasting management relationship there. The ranchers have maintained viable operations with no question that the range has improved and the trend is definitely upward. The cooperative coordinated approach has led to cooperation rather than confrontation. In almost 10 years now, no appeals have been filed on any of the grazing decisions and the Bureau has gained partners actively participating in resource enhancement. The BLM is accepted and recognized in that area as a good neighbor. I think those should be the kinds of goals that we all want in resource management.

I want to make 3 quick points that I feel are critical to monitoring that illustrate that monitoring and management are inseparable. A lot of these have been said to some degree already, but I think they need to be reemphasized.

First, monitoring data means nothing if it is not converted into management actions. Participation by the permittee is essential if management actions are to be effectively carried out. The permittee needs to understand why actions are necessary and hopefully will become part of the decision making process.

Second, range management is not an exact science. It is more of an art than a science. It is the art of applying scientific principles to a constantly changing situation, utilizing the available scientifically collected data, and combining them with observations and experiences of all interested parties. Then, developing management actions that all involved parties conclude will lead to an improving situation--Fully recognizing other management adjustments will be necessary as conditions continue to change. This program will never be over. It's the process of ordinary management.

Finally, monitoring should tell the manager to what extent he's meeting management objectives. It should also provide information which, through professional judgment and consultation with the user, lead to management actions which more closely approach allotment management objectives.

I want to focus on one of Maitland Sharpe's concerns. That is, that monitoring is one of the greatest communication tools in range management. Its collection and interpretation provides tremendous opportunities for people of diverse viewpoints to reach understanding. Once understanding is achieved, communication commences. Continuous open communication leads to trust, then to participation, then to positive relationships, and then positive experience. Long-term resource improvements can result from those relationships. It's a lot more fun than fighting. If you haven't already tried it, I think you will like it. I feel very strongly that as an agency we cannot do these things alone. We have to have the help and support of the other people on the rangelands. If we will do that, we will succeed, and the program will continue to produce benefits. If we don't involve others, then it really can't work.

RANGELAND MONITORING

Pete Jackson

Good Morning.

I have to deal personally with BLM people because I have a operation in southwestern Montana and I can relate back to when we use to pay 3 or 4 cents for an AUM. In fact, I had one permit that the fella said it isn't worth writing up the lease, if you write it up we'll sign it. and I finally said section 29, 30, and 31, minus the patented mining claims.

I do want to compliment you on the progress you folks have made from where you had to start which was literally as janitors, you were watching land that was supposed to be sold, now its land that has an organic act of its own and you have moved ahead at probably the most rapid rate of any group I have had the opportunity to observe. In particular, your involvement in the society, the presentation of papers, sitting as chairman of major committees, only as an example, just one, and there are many more, and that is that Billy Templeton will be chairman of our Planning Committee for next year, and that is one of the prestigious committees of the Society.

In regard to monitoring, I attended a meeting in Salt Lake City and watched some of the BLM folks come in there and really work hard on this particular situation, on this new effort. And I was impressed. What I was most impressed about is that you followed up on it. It's great to have meetings. I've watched some of your people and the way they worked in the grazing lands forum in Harpers Ferry, West Virginia last year, and I was proud of that because they took leadership roles, and they led discussions and got into the professional aspects of range management and grazing lands where they should have been.

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DOES RISC OFFER SECURITY?

Lamar Smith

INTRODUCTION

The preface to the 1983 report of the Range Inventory Standardization Committee (RISC) concluded with the following statement:

> "This report is a concensus viewpoint and represents compromise . . . For some readers, some statements will seem radical and threatening . . . To others, the report may appear timid and conservative . . . if the report stimulates thought, research and discussion, and leads to further improvement of methods and concepts, we will have accomplished our purpose."

There is no question that the RISC report has generated discussion and, presumably, thought. At least 12 articles which relate closely to controversies raised in RISC's recommendations have been published in Rangelands. Several agencies have incorporated some of RISC's terminology and approaches into their inventory and monitoring procedures, usually modifying them in the process.

The demands of multiple use planning and reporting on public lands, as well as modern thinking in ecology, have shown us that some long established inventory procedures were inadequate. RISC provided an opportunity to rethink these concepts, as we have been rethinking some of the basics of grazing management also. University professors, as a rule, love this type of situation--makes for great seminars and one gets invited to workshops in Denver. Agency people are usually less excited about it. (We just got the manual published and everybody trained and now you want to revise it again?) But I think we're in for some more unsettled years because, while there is increasing recognition of some of the problems of our previous concepts and procedures, there is less evidence of fresh ideas to improve them.

OBJECTIVES

I shall discuss briefly a few of the points of the RISC report which have generated controversy to try to explain why RISC took the position it did and to interject some of my own ideas as well. In this, I will concentrate on topics related to ecological sites and range condition. Vegetation measurement techniques are the subject of other speakers on the program. I will also outline some approaches to range condition used in other countries.

RANGE SITES VS. ECOLOGICAL SITES

Few would argue that some system of classifying land according to its intrinsic characteristics is useful in land management. Recognition of differences and similarities in land types (or ecosystems) provides a basis for mapping, inventory, estimating potential productivity, and for extrapolating information on successional patterns, species adaptation and responses to management practices. The basic concept is useful whether one is interested in livestock forage, wildlife habitat, timber production, watershed protection or other values. In multiple use management it would be desirable to have a common approach to land classification for all uses and disciplines.

RISC accepted the concept of range sites for a basic land classification unit and felt that "range sites" could be used not only for "rangelands" but for forests and woodlands as well. RISC chose to call the basic units ecological sites rather than range sites for one reason only: to many people and to some agencies the word "range" refers only to livestock forage and that "range sites" are defined and only useful for the management of range for livestock grazing. That viewpoint is wrong, but nevertheless deeply ingrained. RISC believed that a more neutral term would promote acceptance of the range site concept by other disciplines and allow its use on lands where it was not previously used. RISC did not change the basic concept of range sites and, in fact, patterned most of their discussion of sites after the SCS's National Range Handbook. I personally do not like the name "ecological site"

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(is there such a thing as a non-ecological site?) but it was difficult to come up with another name which had not already been employed in a different sense (e.g., capability area, land type, land unit, etc.). Many people have objected to the term ecological site, but let me reemphasize that as far as RISC was concerned ecological sites are synonymous in concept to range sites. Apparently the people who have objected simply don't think that a rose by any other name would smell as sweet.

RISC recommended that ecological sites be given a two-part name. The abiotic part would be descriptive of features of soil, topography or parent material (e.g., Limy Slopes, Loam Bottom, etc.) exactly as range sites are named. The biotic part would consist of the names of prominent plants in the presumed potential natural plant community (PNC) for the site (e.g., big sagebrush bluebunch-wheatgrass). Many have complained that the biotic name is undesirably cumbersome and unnecessary. I agree wholeheartedly, not just because it is cumbersome, but because attaching a plant name gives the impression that the vegetation named is the management goal (If this is a big sage-bluebunch wheatgrass site, why has it got crested wheatgrass on it?). However, there was considerable evidence that people in certain areas and in certain agencies who have traditionally worked with habitat types and with vegetation cover types would find the abiotic name alone unacceptable.

Habitat types and ecological (range) sites are similar concepts, but not identical. The amount of variation in the PNC allowed within a habitat type seems to differ considerably among investigators. This probably true of ecological (range) sites also. Generally, habitat types are described based on floristics, and do not account for differences in productivity. Quite dissimilar soils, topography, and rainfall may be included within a habitat type. Habitat types seem a less useful basis for land classification than ecological sites because they are much less uniform in productivity or response to management.

This aspect brings up a final point with regard to ecological sites. For ecological sites, RISC used essentially the National Range Handbook definition of range sites, except for the addition of the statement that different sites may differ in response to management. There was some criticism of this addition because reference to management tarnished the pure "ecological" nature of sites. Such criticism is difficult to understand. The real reason we classify range sites is to predict management responses. For example, if we apply such practices as burning, rest-rotation grazing, no grazing, reseeding with blue panic, grass, etc., what will happen on a given area? We make such predictions, and decisions based on them, because we think that the area in question will respond in a similar way to another where we have experience because they are the same ecological site. If two areas are called the same ecological site and do not respond to simiiar management in a similar way, what is the utility of the site classification?

RANGE CONDITION

RISC recommended that range condition be divided into two parts--ecological status and resource value ratings (RVR). Ecological status was to be evaluated by independent ratings of vegetation and soil. The ecological status of vegetation was to be rated according to its similarity to the PNC in terms of species composition by weight and categorized as low-seral, mid-seral, high-seral, or PNC. These recommendations have been widely criticized, and some of the criticism is valid in my opinion (some is hogwash).

First of all, it upsets some people that PNC has been substituted for climax as a standard of comparison. There is, or course, no real agreement on a definition of climax or even whether the concept has any validity at all. RISC felt that most range people consider climax as meaning the "original," "pristine," or "undisturbed" vegetation, i.e., that vegetation which existed when European people arrived on the scene. (There were no Indians on RISC, or we might have had to define climax as what existed when man first crossed the Bering Strait!). Using potential natural vegetation (PNV) at least avoids the absurdity of assuming that any plant or animal which has immigrated since the Mayflower landed is an alien and ecologically inferior. Using PNV also allows us a lot of flexibility in deciding what the PNC "should" be. Potential natural vegetation is supposed to be the stable endpoint of succession starting with present vegetation (including undocumented aliens) and with no further interference by man (or women either). Actually, man does get a chance to interfere a bit in this scenario since we have to decide the environmental conditions under which this succession will proceed. Are we going to allow wildfire? How often will extreme drought occur? What species and population sizes of wildlife are included--e.g., any buffalo?

In my view, both climax and PNV are abstract concepts largely irrelevant to range management. The vegetation the white man first saw was not necessarily undisturbed, stable or desirable. The only thing we know for sure about it is that we won't have it anymore. Potential natural vegetation, by definition, does not exist. Furthermore, it cannot ever exist because we have no intention or possibility of letting succession run its course without man's interference. So we have a choice between what never was and what never will be. Does that comfort you?

RISC's recommendation to change condition classes from excellent, good, fair, poor to PNC, high-seral, mid-seral, and low-seral was intended to avoid the value judgment implicit in the old terms. We range managers know that we don't want all ranges in "excellent" condition, and the wildlife managers and dryland foresters are even more emphatic about it. But it is difficult to convince some groups that saying we like "fair" condition range is not a confession of failure to manage or a cover up for the livestock industry. Of course, changing the terminology as RISC suggested didn't help much. The recent Natural Resources Defense Council/National Wildlife Federation report on "range condition" simply changed the names back to excellent, good, fair, and poor.

Here is the problem. If we want to derive a single rating of "condition" of vegetation by comparing present composition to some standard, then the standard ought to be the management goal. Only in this way will "sub-standard" have its logically expected connotation of "undesirable." Now, to some extent, range managers have always done this. We often made two big assumptions: (1) climax for some reason was almost all good forage species for livestock and (2) succession alone would restore these plants if we let it by removing livestock (although we often found it useful to help succession along a little by burning, seeding, spraying, plowing, and bulldozing!). All we need to do is redefine the standard as the type of plant community capable of being produced on the site which will maximize resource values for desired uses and which can be achieved under economically and environmentally acceptable levels of management investment. But, this approach is no longer "ecological" is it? It departs from the concept of a non use-oriented rating. It muddles everything up with management and economics and human desires. Don't we need a pure and absolute measure of where we stand "ecologically," where we are on the successional scale? No, we do not! What purpose can it possibly serve except to draw criticism from someone who prefers a different rung on the successional ladder? What rational decision can be made from such information?

To evaluate ecological status of the soil, RISC proposed that ground cover (or percent bare soil) be compared to the amount of cover expected in the PNC. Independent evaluation of vegetation and soil was advocated many years ago by Lincoln Ellison, and has long been used by the Forest Service. Ellison thought that any site experiencing accelerated erosion was in poor condition no matter what the vegetation. The new Australian book on rangeland management agrees, stating: "Vegetation changes, but soils degrade." Nevertheless, this viewpoint is easier to talk about than to put in practice. Since most arid and semiarid range sites experience some, and often quite a lot, of natural erosion, the problem is one of deciding how much erosion (or bare ground) is acceptable.

Some people do not agree that soil cover (or other erosion-related attributes) need to be measured. They argue that the higher the successional status of the vegetation, the more effective it will be in site protection. Thus changes in composition toward lower successional plants are good early indicators of incipient increases in soil erosion. For example, Blackburn's work in the Edward's Plateau in Texas shows increases in runoff and erosion as the vegetation "regressed" from oak thickets to mid-grass to shortgrasses. Presumably, the mid-grass community is considered to provide "adequate" protection since I have not heard any recommendations from Texas A&M to increase oak thickets.

Nothing ever works as neatly in Arizona as it does in Texas, however. In the desert grassland, increased mesquite and other brush seems to increase runoff and erosion on upland sites compared to perennial grass communities (including those dominated by the exotic Lehmann's lovegrass). Succession in the absence of fire appears to lead to increased shrubs--at least all our observations indicate shrubs are "succeeding" very well. So, while it is clear that some vegetation types are more effective in soil protection than others on a given site, it is not clear that successional status has any necessary relation to that protective ability.

Measuring ground cover or bare ground consistently is not easy, especially on gravelly soils. Bare ground tends to fluctuate a lot depending on time of year, weather, grazing or other disturbances. These variations complicate monitoring of long-term trends. Whether we try to correlate site protection with vegetation structure and/or composition or to measure cover or bare ground directly the basic problem remains that we really don't know how much erosion is acceptable.

RISC suggested that in addition to rating ecological status the utility of the vegetation for one or more specific purposes could be expressed as a resource value rating (RVR). This concept was not new, although the term might be. Previously, wherever the range condition based on presumed successional stages was correlated with grazing capacity for livestock, then "range condition" and livestock forage value were synonymous. Where the successional pattern was not positively correlated with forage production, as in woodlands and forests, the National Range Handbook drops the range condition concept and rates forage value directly by tree canopy class and understory composition. That is a RVR. All RISC did was to say that the same idea could be applied to uses other than livestock grazing. Since, as with livestock forage value, other values may or may not be correlated with successional status, if it is necessary to independently evaluate each.

RANGE CONDITION IN AUSTRALIA AND SOUTH AFRICA

In view of our difficulties in arriving at a satisfactory way to evaluate condition, it is interesting to consider what the experience in Australia and South Africa has been. It appears that neither country made an effort to develop a formal method of evaluating condition until the 1970s. The Parker method was rejected because of excessive variation among observers, and the Deming method was rejected because of subjectivity of the rating scales. The QCM or Dyksterhius method was used, to some extent, in the Northern Territory. However, it was found that basing condition on composition alone did not account for large changes in ground cover and soil erosion not related to composition.

Allan Wilson has criticized the QCM, citing three points. First, the method does not adequately recognize the wide fluctuations in species composition which may occur in the absence of grazing and persist for long periods due to drought, fire, insects or other reasons. These fluctuations are probably more accentuated in Australia than in most USA locations (except for Arizona). Secondly, Wilson states: "There is a logical deficiency in using ungrazed vegetation as a standard of excellence for a grazed vegetation." and third, there are so many attributes of plant communities and soils that can be important for various uses or objectives that it does not seem reasonable to suppose that general condition can be adequately measured using only plant biomass.

Wilson outlined a number of methods used by the various state governments (in Australia much of the range is state land) but most of these seem to emphasize monitoring of trends rather than independent establishment of condition classes or ratings. The Australian experience confirms some of the problems in U.S. methods, but no widely-accepted alternative has emerged. Wilson suggests that both vegetation and soil should be independently rated. The condition of either could be based on several attributes, the relative importance of which may vary depending on the location or purpose of assessment. He predicts that there will continue to be a variety of methods to accommodate diversity in land uses.

In South Africa, Barney Foran adapted the QCM for use in Dry Tall Grassveld, Moist Tall Grassveld, and Highland Sourveld. These range types are most productive for livestock grazing in a "sub-climax" situation. Thus Foran used this sub-climax state as excellent condition and called the dominant grasses for this stage decreasers. If the range is undergrazed or infrequently burned the decreasers tend to be replaced by plants which are inferior as forage (Increaser I). On the other hand, if the range is overutilized a different group of plants (Increaser II) replace the decreasers resulting in a reduced soil protection and forage value. Foran also incorporated a soil cover measurement in his method.

After several years experience with this procedure some modifications were made. The ground cover measurement was separated from the condition score. It was recommended that specific benchmark sites in local areas be used to represent the "excellent" standard to better represent site and weather differences. On shrub ranges the procedure was applied to the herbaceous component, but supplementary data were taken on shrub composition and population characteristics. Until the time of these publications there had been little work done on range condition in the drier ranges of South Africa. The authors speculated that since the "climax" grassland in those areas was the optimum for grazing, as it is in some American grasslands, the QCM method should work without modification. Whether experience has modified that view, I cannot say.

It should be pointed out that the South Africans were trying to develop a range condition classification which results in condition scores correlated with grazing capacity for livestock (in RISC terminology, this is analogous to an RVR). In fact, they combined the plant composition score with scores of ground cover, soil erodibility, and topography into a method of estimating carrying capacity.

CONCLUSIONS

The experience with range condition in both the U.S. and overseas in Australia and South Africa lead me to the following conclusions:

1. The importance of site potential cannot be overemphasized. However, because of local variability in site potential and changes in vegetation due to weather and other phenomena not controlled by grazing management, the selection of realistic benchmarks or standards of comparison needs to get more attention than it has.

2. Range condition is not something which can be measured, and there is no "ecological" rating which can sum up in one word or number all we need to know about rangeland. We can measure attributes of vegetation and soil, but "condition" is an interpretation we make of these data based on our management objectives and our understanding of ecological principles. Which attributes and how many we choose to measure depends on our judgment about their relevance for specific management decisions.

3. No, RISC does not offer security. It does not because it still relies too much on the "ecological condition" approach. BLM needs to evaluate range condition to monitor its own management and because Congress has required it. Unless you define range condition in terms of your management goals, the ratings are not going to be much help to you or anybody else.

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SETTING OBJECTIVES AND PICKING APPROPRIATE METHODS FOR MONITORING VEGETATION ON RANGELANDS

W. A. Laycock

A wide variety of methods are available for monitoring vegetation or other characteristics of rangelands. Too often a method is chosen because the manual dictates its use, the technician is familiar with or "likes" a certain method, or because the method was used somewhere else. Methods chosen in this way may or may not produce results that are meaningful to management.

The BLM publication "Planning for Monitoring" states "The basic need for rangeland monitoring . . . is identified by the objectives which originate in land-use plans . . . Management objectives from land use, coordinated resource management, and activity plans establish a framework and criteria for determining the level of intensity and reliability desired for monitoring." If this is done a start has been made but it does not dictate deliberate objective setting in order to select appropriate methods for monitoring at the allotment level.

Several deliberate steps need to be taken in the planning of monitoring procedures for an allotment or other area before any method or combination of methods are chosen. The planned uses on the allotment need to be defined. Then, a decision needs to be made on what attributes of the vegetation or of the site need to be sampled in order to be able to determine condition of the site and detect changes over time. Choosing the attributes and methods requires a knowledge of the ecology of the vegetation and a very deliberate process of objective setting. Too often, if an objective is set at all it simply is something like: "to determine trend" or "to determine what impact livestock grazing (wildlife) is having on the site." These types of objectives simply are too broad and are not suitable for adequate planning.

Objectives for monitoring need to specify what type of information is important to a manager. Then specific objectives need to be set for the allotment as a whole, for each vegetation type to be sampled, and for each transect or site to be sampled. Instead of setting specific objectives, too often the plan of action for monitoring is--"lets measure everything and then we will know if something (anything) changes in the future." Even with unlimited money and manpower, this approach may lead to failure because the monitoring effort has no real purpose. Those charged with interpreting the data in the future may simply be confused by a mass of conflicting information. Because we seldom have unlimited time and money, the "measure everything" approach leads to an even more serious problem. Sampling for all attributes for all species and recording all possible other site information takes a lot of time. This results in too few transects in each vegetation type, too few vegetation types, and too few allotments being sampled. In times of limited budgets, very specific objectives must be set to make the most efficient use of time and money.

The following are some questions and sub-questions that need to be asked before specific objectives can be set for monitoring a given area of rangeland:

1. What are the proposed uses of the area--kind of large animal (cattle, sheep, deer, elk, etc.), season of use by each kind of animal.

    a. Importance of area to other species, e.g., sage grouse.

    b. Importance of area to other users--recreation, ORVs, etc.

2. Do you need detailed information on individual plant species in order to make management decisions or are some more generalized descriptions of the vegetation suitable?

3. If changes in species composition are important to detect--what species should be monitored and what species can be "lumped?"

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a. Are "key" species different for different animals?

b. In what vegetation types are the important species found?

c. What method is best to detect changes in the chosen species?

d. How are the results obtained by the method(s) chosen affected by year-to-year weather variations?

Do you have enough years of data with narrow enough confidence limits to adjust data for a given year to a "normal" year? If not, adjustments may be erroneous or useless.

4. If total production (biomass) is important--do you need it measured by species, species group, palatability groups, or just total?

5. If information about watershed protection is important--

a. Is total cover (plant plus litter) adequate information?

1.) Aerial (first hit)?

2.) Basal?

b. Should plant cover be measured by species, species groups, or just total?

c. Is size of bare soil openings important?

d. Is litter dispersion on bare soil openings important?

e. How much soils data is needed--texture, depth, structure, erodibility, etc.

6. If more than one vegetation type is important to a specific animal or sensitive to grazing pressure--what types should be monitored?

a. What kinds and how many sites within a given vegetation type should be monitored?

7. What types of actual use information and actual utilization records are needed to determine how changes in management affect use patterns and percent utilization of important species.

8. What types of "other" use data needs to be collected, i.e., amount or ORV use, impact of that use, number of visitor days of other types of recreation, etc.

I don't have time to cover all of these questions with examples but the following will give some idea how the questions might be applied to a specific situation. Consider a sagebrush-grass range in fair condition with a thick stand of sagebrush and some of the desirable species in the understory. Herbage yield is below what is desired. There are no apparent signs of erosion or other watershed problems. Uses are summer cattle grazing and fall, winter, and spring use by mule deer and year-round habitat for sage grouse. There is little recreation and no ORV use. The present situation is marginal for supplying summer cattle feet, is adequate for winter deer and sage grouse habitat, but is inadequate for spring deer and sage grouse habitat. Deer should have better grass and forb production in the spring (and fall?). Grouse need some openings in the sagebrush with forb production in these openings for chicks and possibly better grass seed production in the fall.

In this situation, the first thing you need to recognize is that, unless you do something to reduce the sagebrush, changes in grazing management are not going to change species composition in the short term and perhaps for a very long time. Thus, the shortcomings of the area listed above will persist. If you do nothing with the sagebrush, it will continue to dominate the site and understory production will increase only slightly even with "good" management. Sagebrush control would improve the range for cattle grazing but a mosaic of sagebrush control and untreated areas would be best for deer and sage grouse. The choices for monitoring methodology depend upon what you plan to do with the allotment.

Option 1: If you do nothing with the sagebrush and your livestock grazing management is not expected to cause further deterioration, little change can be expected in species composition and habitat value of the area.

1. Sagebrush--repeat photographs from permanent photo points probably will be an adequate monitoring procedure.

2. Understory--Frequency may be the simplest and most efficient methods.

3. Utilization--Cattle and deer-actual use records and spot utilization checks. Sage grouse-observations on numbers and use.

Option 2: If you do nothing with the sagebrush but are not sure if your present grazing management will prevent further range deterioration. Habitat value for cattle, deer, and sage grouse may deteriorate. Watershed condition may deteriorate.

1. Sagebrush--repeat photographs or cover or density estimates may be desired.

2. Understory--Frequency by itself will not be adequate. You will need to measure cover, production or some other attribute to detect change.

3. Watershed condition--some total cover estimates are essential and other observations may be necessary to detect runoff and erosion.

4. Utilization--Same as Option 1.

Option 3: If you control sagebrush (total or in a mosaic) you are faced with a different monitoring problem to measure effectiveness of your control, monitor changes that will take place as sagebrush either thickens or reinvades, to monitor changes in use patterns, and assess the changes in wildlife habitat.

1. Sagebrush--some measure is needed before and after control. Cover estimates or density may be appropriate.

2. Re-invasion or re-growth or sagebrush. Estimates of density or frequency will pick up seedlings as sagebrush re-invades. Cover estimates will detect changes in cover if the sagebrush control was not complete.

3. Understory--one of the reasons for sagebrush control is to release the understory so you probably will want to estimate herbage yield before control, after control, and then at intervals to determine how understory production is affected by the invasion or increase in sagebrush over time. The main question is whether you need data for all individual species, just key species, by classes of vegetation, or groups of similar species.

4. Utilization: Cattle and deer--more detailed actual use records and utilization records are needed. Sage grouse--better observations of actual habitat use in different seasons, especially in sagebrush control areas in spring to determine if mosaic has actually increased brood survival.

It should be obvious that the choices of methods for monitoring the areas described are quite varied and depend upon the ecology of the vegetation types, the use of the area by different animals, and the proposed management. Because of this, very specific objectives must be set before any method or combination of methods is chosen for the allotment as a whole, for the vegetation types being monitored, and for the specific transects or sample locations.

Various characteristics of vegetation can be measured or estimated in any monitoring effort. I have been asked to discuss the advantages and disadvantages of herbage yield (production, weight, or biomass), cover, density, and frequency. On the surface, this seems to be an easy task but, in fact, much of the "conventional wisdom" about these measures of vegetation is only partly true.

L. t' Mannetje (1978) pointed out that vegetation is measured for three purposes: 1) to describe studies of vegetation, 2) to assess changes brought about by management, and 3) to determine the ability of vegetation to provide animal feed. Purpose no. 2 also would encompass determination of condition and trend on rangelands and usually is the goal of public land managers. However, we cannot lose site of the fact that purpose no. 3 is vitally important to the owners of the animals in the case of permittees on public lands and to the wildlife manager in the case of game or non-game wild animals.

HERBAGE YIELD OR BIOMASS

This is one of the most widely-used measurements on rangelands to evaluate vegetative or ecological change. The amount of vegetation produced generally is considered to relate directly to how many animals can be grazed. Herbage yield often is measured at the time of peak above-ground standing crop and this value is often used to determine stocking rates, allowable levels of utilization, and to make other management decisions.

In a paper to be presented at the 1987 SRM meetings in Boise, Currie (1987) points out that, while herbage yield information may be useful or determining range condition, it is much less useful for predicting livestock management needs unless forage quality is also measured. Both herbage yield and forage quality information is needed at the time of grazing, not at some other time during the year. Several thousand pounds of cured and leached standing grass and low in palatability is far less valuable for livestock production than several hundred pounds per acre of palatable herbage that contains adequate levels of N, P, and other nutrients. The same is true for plants valuable for wildlife. In order for proper management decisions to be made for both livestock and wildlife, both the amount of forage and its nutritive value needs to be known for the time that utilization will take place.

One of the biggest problems with herbage yield is the great fluctuations which take place from year-to-year caused by changes in precipitation. Yearly changes in yield usually are far greater than short-term changes caused by either reduced or improved vigor as a result of management. Thus it is difficult to determine trend in range vegetation using yield unless sampling at the beginning and end of the period is done in similar years with similar herbage yields. Since this is seldom the case, many research efforts have gone into trying to relate herbage yield to precipitation at various periods prior to or during the growing season. For example, in Colorado Currie and Peterson (1966) determined that April precipitation best predicted forage yield of crested wheatgrass on ranges grazed in the spring but that May and July combined precipitation best predicted herbage yield on fall-grazed ranges. Other investigators have had to use precipitation for much longer periods to get good correlations. Some of these studies have yielded reasonably high correlations over long periods of years. However, when you evaluate how well a regression equation derived from such measurements will predict herbage yields in one specific year, the confidence interval usually is quite high. Thus, attempts to "correct" data taken in a year with more or less than "normal" precipitation usually are futile and meaningless. If you think you have a long-term data set of rainfall and herbage yield that you want to use to make such corrections-- please consult a statistician and have him/her compute the error for correcting yield in any single given year to some "average" or "normal" year.

COVER

Cover was one of the first characteristics of vegetation used in range inventories and research studies in the U.S. The "square-foot density" method (Stewart and Hutchings 1936) an estimate of cover that was widely used. The term "density" was an unfortunate choice of words because the proper definition of the term density is number of individuals per unit area.

One of the reasons cover was used in early studies was that there was a great deal of concern for watershed conditions on deteriorated rangelands. This is still the main advantage of cover measurements, i.e., total plant and litter cover provides one of the best indices of the stability of a rangeland site. Therefore, any time that determination of runoff, erosion or other watershed characteristics are defined in monitoring objectives, some estimate of cover is essential. However, total cover (plant plus litter) may be all that is needed instead of detailed estimates of individual species.

Two of the most common ways to measure cover are basal and aerial. Basal cover is the amount of the surface covered by plant bases at the soil surface. Aerial cover is the vertical projection of aerial parts of the plants on the ground. Both are reported as a percentage of the total ground covered. Basal cover is a more stable measurement, i.e., it will likely remain more nearly constant from one year to the next and thus may be more useful for determining trend. However, basal cover is quite low and difficult to estimate for forb and rhizomatous or single stemmed grasses and it probably is meaningless for shrubs. Aerial cover is more likely to fluctuate from year-to-year and may be high when herbage yield is high especially for herbaceous species, but may be fairly constant for shrubs. Therefore, the growth characteristics of the plants in the areas you wish to monitor need to be known before a decision is made on what type of cover measurements to make. Litter is also valuable for soil protection and must be included in any cover estimates. A general view photograph is one way to make a record of cover that is very general but can be quite valuable over time.

DENSITY

The proper definition of density is "number of individuals per unit area." This is the only correct use of the term and density should never be used to describe some aspect of cover. Laycock (1985) described the various methods to determine density and evaluated its effectiveness.

Advantages

For late seral stages of most communities, density or perennial species stays relatively constant from year to year even though size of plants may vary greatly. Thus density should be a more stable indicator of range condition than either yield or cover.

Disadvantages

Individual plants of single stemmed herbaceous species, shrubs, and trees are easy to determine. Defining and consistently recognizing a "plant" of multi-stemmed shrubs or rhizomatous or sod forming herbaceous species is difficult or even impossible. Bunch or tussock forming grasses would seem to have a life form that would allow easy differentiation of individuals. This often is not true because the bunches eventually develop dead centers and then divide into several to multiple distinct and separately-rooted plants that cannot be distinguished without probing at the soil surface. Such situations make it almost impossible for two different examiners to come up with the same counts of "individuals" on the same plot.

The other disadvantage of density is that species composition figures, needed for condition determinations, are almost meaningless when determined by calculating relative density unless all species are similar in size and spread (Penfound 1945). This rarely occurs on rangelands. A single small forb or grass and a single sagebrush plant both have a density of "one" and thus are equal in terms of species composition. Obviously, this will give species composition figures that have little relevancy. Oosting (1956) stated: "since it as absolute expression, the significance of density in interpretation may be overemphasized . . . Not all species with equal densities are of equal importance in a community or need they be similarly distributed." Penfound (1945), while recognizing the shortcomings of density, indicated that the density relations of species does not change with quadrat size, number of species or total plant cover and stated: "These facts suggest that density is a truly quantitative condition and is a more reliable one than frequency."

Laycock (1985) concluded that: 1) density is not a suitable method to sample entire range communities, 2) accurate density values can be determined only for species in which distinct individual plants can be distinguished easily and consistently by any observer, and 4) relative density is not a meaningful measure of species composition.

FREQUENCY

Frequency is "the percentage of occurrence of a species in a series of samples of uniform size contained in a single stand, numbers and sizes of plants in each sample being ignored" (Daubenmire 1968). Frequency is one of the oldest quantitative methods used in plant ecology to characterize vegetation. Hironaka (1985) summarized the frequency method as applied to rangeland vegetation. The advantages of the method are that it is simple and rapid and can be mastered by relatively inexperienced technicians. The main disadvantages are that the non-random-distributional pattern of most plant species populations makes interpretation of frequency estimates questionable and renders frequency data unsuitable to describe vegetation when used alone. Penfound (1945) stated: "Apparently frequency is the most artificial and the least important of the three concepts of frequency, density, and cover. It has been used entirely too often and for too many purposes in the past two decades and should be employed much less in the future."

Because of its ease of application and simplicity, frequency has been adopted as the primary (and sometimes sole) measure taken to determine range condition and trend by several BLM state offices and some Forest Service units. The proponents of frequency have outlined cautions about the interpretation of frequency data. Hironaka (1985) stated: "A person who understands the complex ecological relationship between the species' frequency and density, basal area and pattern, should interpret the results of frequency sampling. It is impossible to determine which of the three parameters has changed unless additional measurements on density and basal area have been taken. A significant change (in frequency) indicates that the community has changed in structure due to the change in behavior of a specific species. Which species are the important ones for consideration are determined by the management objectives. They are the ones that indicate whether the objectives are being achieved or not."

Other cautions on the validity of frequency for determining change in vegetation were voiced by Laycock and McGinnies (1983) and by West (1985).

West (1985) stated: "Because frequency is highly sensitive to plant size, density, and dispersion patterns, a set of nested plots of different sizes is usually employed. This, however, violates the statistical requirement for independence of samples." He further stated: ". . . because frequency data are so dependent on plot size and sensitive to non-random dispersion patterns that prevail on rangelands, managers are fooling themselves if they calculate percentage composition from frequency data and try to compare different sites at the same time or the same site over time in terms of total species composition." Hironaka (1985) agreed and stated: "The role or importance of a species in a community cannot be visualized by its frequency value . . . It is not a suitable measurement to describe vegetation." In spite of these warnings, it was inevitable that a method would be proposed using species composition based on relative frequency (the frequency of a species divided by the total of all frequencies expressed as a percentage).

Mosley et all. (1986) described a way to use frequency as a method for monitoring changes in species composition. While the authors recognized that "species composition based on frequency is not equivalent to composition by yield or cover" they failed to heed the warnings summarized above that frequency cannot be used to determine species composition under any circumstances. Managers have to be aware of the deficiencies of frequency and the extreme limitations on its interpretation. Using frequency as the only measure in a monitoring scheme is playing Russian roulette. Using frequency in addition to some other method provides valuable information on dispersion patterns of individual species. In either case, in my opinion, frequency data should never be used to calculate species composition.

CONCLUSIONS

West's (1983) statements are a fitting conclusion to the summary about sampling methods: "It is fruitless and even dangerous, to continue the search for the index of range condition or trend that will work in all types of vegetation for all purposes. Range condition and trend are concepts related to succession. We know now that succession manifests itself in different ways in different contexts of plant communities . . . Since each variable emphasizes different characteristics of vegetation, an appropriate measure of trend must be chosen with reference to the purpose of assessing range condition."

The last phrase is the real key--only when objectives are set, can appropriate sampling methodologies be chosen.

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MANAGING GRAZING ON RANGELANDS

J. Wayne Burkhardt

The grazing of domestic or semidomestic livestock on rangelands has been one of the oldest activities of man. Longevity of this practice now withstanding, the management of grazing continues to generate conflicts and grazing problems continue to exist, especially on public rangelands of the West. Many of these problems stem from grazing during the late 1800s and early 1900s when grazing pressure on public rangelands of this country were at a historic high. These public ranges supported an estimated 41 million AUMs of livestock grazing in 1920 while approximately 17 million AUMs have been used more recently (Wagner 1978). Paralleling the reduction in livestock grazing pressure on public lands has been an improvement in range condition on many areas (Strickler and Hall, 1980; Phillips, 1963; Reid, et al., 1980; Gruell, 1980; U.S.F.S., 1976). Given the advantage of historical perspective, it appears general overgrazing (grazing use exceeding forage production) was the problem during the early part of this century and that reduction of that grazing pressure was indeed a significant part of the solution to grazing problems of that era.

Today's grazing problems on public rangelands are somewhat different in nature, although no less controversial. Generalized overgrazing of earlier times has been replaced by selective or localized overgrazing. Poor distribution of grazing pressure, improper season of grazing and the wrong type of livestock appear to be a common denominator in many of our current grazing problems. Continued general reductions of livestock numbers does little to solve many of these current problems. However, better management of grazing may well provide a solution.

Successful management of livestock grazing on western rangelands is little a science and much an art. The vast expanse of most grazing allotments; the amount of variability of vegetation, terrain and weather; lack of direct control of precludes the replication and repeatability so basic to research and the scientific method. Successful grazing management is a matter of continually observing the actual grazing use occurring on an allotment, noting the effects of such use and then using these observations to make adjustments and decisions regarding succeeding year's grazing. In the case of public rangelands, the process of observation and adjustment or decision making must be a joint effort by at least the range manager and the livestock manager. Additionally, a record of these continuing observations and decisions is important. Good grazing management is a matter of continual change and adaptation to the changing range situation. Fixed grazing plans or schemes rarely produce good management and rarely is there a "single ideal or best grazing plan." Good grazing management results from the skill and attentiveness of the managers and not from routine collection and analysis of large amounts of quantitative data.

The process of observing actual grazing use on an allotment and noting the effects of that use on the range has been referred to as monitoring. Monitoring of rangeland grazing when properly done provides the information base for good grazing management decision. If livestock grazing had been effectively monitored in past years, better grazing management of our rangeland would have resulted and impacts of grazing on vegetation and soils could be more adequately assessed. Monitoring should identify the nature of grazing use and other important influences which occurs on the allotment each year (annual monitoring of causal factors) and should document the effects or subsequent changes in the range system resulting from these influences (long term monitoring of trend). On allotment with grazing plans monitoring provides the necessary information base to assure that actual grazing is following the plan and to determine if plan objectives are being accomplished.

ANNUAL MONITORING

Annual or short term monitoring should document the nature of grazing use which occurred on an

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allotment or should determine if that grazing use actually was in accord with the grazing plan. Additionally, annual monitoring should provide a record of other important events occurring on the allotment which influence vegetation and soils. This level of monitoring is the primary tool of grazing management and should come ahead of all other studies. Without the information derived from short term monitoring, the results of any other monitoring cannot be interpreted correctly. These short term studies involve the development of actual grazing use records, the mapping patterns of use and identifying problem areas over the entire allotment or pasture. In general, there should be a reliance at this level of monitoring on qualitative observation of conditions over the entire pasture or allotment rather than on measurement of a few transects.

The purpose of annual monitoring is to document the nature of the current year's grazing - what intensity of grazing and what problems occurred on what portions of the allotment as the results of what kind of number of animals grazing during what seasons. Without answering these questions for each year's grazing, there is no basis for evaluating the effects of grazing. Certain impacts or changes that may occur to the resources as the result of grazing must be related to type of grazing that produced the impacts.

Actual Grazing Use Records

Accurate records of actual grazing use should be maintained for all pastures or fields used during the grazing year. As data is recorded and accumulated it will provide livestock managers and range managers with accurate information on the number, kind and class of livestock and grazing periods for each pasture or allotment.

The actual use record generally takes the form of a pocket herd-book or pocket diary which is carried when working livestock. Any pertinent livestock or range information is recorded in this pocket herd-book so as to become a complete record of livestock and grazing activities for the year. This is a record of livestock moved or gathered, sickness and death losses, grazing distribution and watering problems, salting record, forage conditions and any other matters important to the grazing operation. Actual use information is the day to day working record of a range livestock operation and is the primary responsibility of the livestock manager.

Use Mapping

The range inspection tour and resulting use map is a most important tool in grazing management, and unfortunately, the most often overlooked. It is needed to identify distribution problems and solutions, and it is the basis for making adjustments in future grazing (Anderson and Currier, 1973).

Annually, near the end of the grazing season or period for a pasture or allotment, a range inspection tour should be made to map degree of grazing use and distribution of that use and to identify problem areas on the allotment or pastures as a whole (not just key areas). This use map should be prepared jointly by the range manager and the livestock manager. Distribution of grazing use in terms of excessive use and insufficient use, both problem areas, should be mapped. Traditional utilization sampling techniques are not suitable for preparing use maps on large allotments as it is of little management utility to measure degree of use precisely on a few transect locations. The question that needs to be answered is what areas of the pasture were under used, correctly used or severely used (use intensity and pattern).

As the use map is being made, field notes of conditions and situation observed should also be made to accompany the map. These field notes should include comments on climatic conditions of that year's growing season which directly affect vegetation growth. A determination needs to be made while the observers are on ground as to whether or not the degree and distribution of grazing use is in accordance with the grazing plan or is acceptable. The use map and field notes are decision information that bear directly on how grazing will be conducted during the next grazing season. Was this season's grazing use (distribution and intensity) satisfactory and, if not, what changes need to be made to correct the problems.

Additionally, at the time the use map is being made, it may be useful to take selected photographs showing utilization levels in certain areas of the pasture. These use-photos support the supplement the use map and field notes.

It is important that the livestock manager and the range manager jointly make these inspection tours and participate in developing the use map, field notes and any decision. It is also important that both parties maintain a record of these actions.

LONG TERM MONITORING

Long term monitoring should document changes (trend) which are occurring on the allotment in vegetation, soil surface and other important resource characteristics. These long term studies provide the measure of whether grazing management objectives are being achieved. To this purpose, qualitative observations alone may not be adequate to identify subtle changes occurring on rangelands. This level of monitoring generally involves long term studies of change over time (trend). It is impossible to measure trend over the entire allotment, therefore these studies are tied to key or critical areas, permanent transects and sampling or measuring techniques and photo-points. These studies need to be designed to measure progress related to grazing plan objectives. The selection of a sampling technique should be determined by the objective and the vegetation character at the transect locations.

Trend in vegetational and soil surface characteristics can be measured using permanent, relocatable transects and photopoints. Generally, frequency of species occurrence, species cover (canopy cover of shrubs and basal cover of herbaceous plants) or species density are measurable attributes of vegetation that reflect changes. Additionally, grazing utilization measurement may be useful at trend study sites to facilitate interpretation of trend data. Trend studies are normally measured on a 3-5 year interval.

On certain allotments or pastures there may be special value resources for which certain objectives were developed in the grazing plan. Examples might be stream fisheries, archaeological sites, critical habitats, etc. When specific objectives relating to these types of resources are developed in a grazing plan, then it may be necessary to design special trend studies to measure the accomplishment of these objectives. The design of these studies would be determined by the nature of the resource and objectives.

Long term monitoring is directed at measuring change over time on an allotment, not comparisons between different allotments. Therefore, consistent and continuous methods are much more important over time than from one allotment or area to another. Only with continuity over time do these studies provide useful answers. Trend studies should provide the reference points or time perspective needed to assess grazing management in the long term.

INTERPRETATION OF MONITORING

The use of monitoring information described above to effect better grazing management is important. Two types of interpretations are appropriate. The information gathered from the annual monitoring effort (annual allotment assessment) should be used each year to make decisions about how grazing will be done next season. Decisions should jointly be made as to how any grazing problem which occurred during the current year can possibly be corrected or avoided next year.

The second type of interpretations should be the periodic (3-5 years) review of documented long term changes (trend) and the determination of cause for these changes. This type of interpretation requires a review of the annual record (events) to define or explain why the documented changes occurred. These interpretations of cause and effects make possible an objective evaluation of whether the AMP or grazing plan is working or is in need of revision.

The entire process of range monitoring should be simple and straightforward process jointly accomplished by the livestock manager and the range manager. The field work for most grazing allotments usually requires no more than 1-3 days at the end of the grazing season (essentially sufficient time to jointly inspect the allotments, make and record the observations and discuss range events of that season).

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INVOLVING RANCHERS IN MONITORING:
THE IDAHO AND ARIZONA EXAMPLES

David A. Bryant

Idaho and Arizona are two states that have become national leaders in the involvement of ranchers in range monitoring. The range workshop effort in Arizona and the Challis Experimental Stewardship Program in Idaho have focused on fostering communication, coordination, and cooperation among ranchers, agency personnel, and other interest groups concerned with the monitoring of rangelands.

During the last decade, we have experienced marked changes in the way that rangeland resource decisions are made (Sharp 1985). This period of change is exemplified by the Experimental Stewardship Program that requires participatory approaches to management. This process is based on the premise that more progress is made in achieving the objectives of management if those affected feel that they are an essential part of the decision process. As Sharp (1985) so aptly points out, this approach provides for free and open discussion among individuals with conflicting viewpoints, and thus encourages an improved basis for understanding the interrelationships of range users and user interests. In the seven years that the stewardship program has operated, livestock reductions have been mitigated, conflicts have subsided, innovative approaches to management and monitoring have been implemented, and the future looks more promising than it did in the mid-1970s.

Since 1977, the University of Arizona's (UA) range management extension effort has also focused on the need for better communication and cooperation among range users and agency personnel (Bryant 1981). The UA range extension program of the late 1970s and early 1980s was built around a series of state-wide workshops for range users and regulatory agency personnel. The Cooperative Extension Service sponsored over 70 range management workshops, short courses, or field tours throughout Arizona between 1977 and 1982. The workshops were conducted in three phases and emphasized range evaluation methods, a self-help program in planning and monitoring for ranchers, and the livestock-management aspects of range planning.

In addition, more than 50 individual requests for range assistance were received by the UA Extension Service during this period (Bryant 1981). In some cases, university specialists rode allotments with ranchers and range conservationists to evaluate range condition, trend, and utilization. When appropriate the offered recommendations about monitoring, grazing systems, supplementation, and herd improvement. Most cases included help with development of a written management plan. From the areas where assistance was provided, ten demonstration ranches were selected for intensive monitoring and study. These ranches represented a cross section of geographic areas, vegetation types, land ownership patterns, economic constraints, and management possibilities. The demonstration ranch program was designed to provide Arizonans with an opportunity to view range management in action in their local communities.

A similar pattern of rancher involvement in range monitoring and evaluation exists on the Lee A. Sharp Experimental Area (LASEA) in southern Idaho. This facility, formerly the Point Springs Experimental Area, consists of a 960-acre tract of land located in the Raft River Valley approximately 35 miles southeast Malta, Idaho. The property was made available to the University of Idaho in 1955 through a cooperative agreement with the Bureau of Land Management. Access for research to an additional 7,000 acres has been obtained by consent of land lessees and owners. Grazing management and salt desert shrub ecological studies have been conducted since the inception of the research and demonstration program. There have been numerous occasions for involvement of ranchers in trend monitoring and other research and demonstration activities on the station. Innovations in monitoring procedures such as at LASEA beginning in the early 1950s.

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The use of photographs in combination with plant frequency of occurrence for monitoring range trend has been demonstrated and promoted in both Idaho and Arizona. The emphasis on monitoring and the need for improved monitoring tools in the late 1970s stimulated the resurgence of interest in plant frequency and photographs. The combination of the two approaches was discovered to be ideal for involving ranchers and other interested parties in the monitoring process. Rapid, easy, objective, and reliable are all adjectives that have been used in reference to the plant frequency plus photographs monitoring system. The wide-spread adoption of frequency and photos in the last five years has been facilitated by the desire for enhanced permittee involvement in range monitoring. The utility of this approach for encouraging communication, coordination, and cooperation in accomplishing the task of monitoring has been well documented.

At about the time plant frequency and photographs gained widespread acceptance as monitoring tools, a new innovation was just beginning to become part of the process. The boom is use of microcomputers since 1982 has been phenomenal. The efficiency and ease of monitoring-data storage, retrieval, and analysis now possible were not apparent as late as 1980. The University of Idaho Range Resources Department began to develop microcomputer software for range monitoring needs in 1983. This effort recently resulted in a major cooperative agreement between the department and the Agriculture Research Service. A portion of the research program is concerned with the areas of artificial intelligence and expert systems. The encouraging aspect of the microcomputer phenomenon has been the ease with which microcomputers may be used for records management by ranchers. Efficient programs are being used for handling plant frequency and other monitoring data as well as animal records. A potential for rancher involvement in monitoring exists that was not conceivable in 1980.

With the sophisticated and efficient monitoring tools now available to us, we must remind ourselves that the most important element in range monitoring is the human one. There are no substitutions for technical competence, on-the-ground experience and a rancher's knowledge of his ranch and animals. When these human factors are considered the most important, almost any monitoring method or approach will yield satisfactory results.

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MONITORING WITH CONSULTATION, COOPERATION, AND COORDINATION

Bud Eppers

I hope that after we depart from this proceeding, that we are united and decidedly in agreement on the direction that we must all go.

We have got to get on with the monitoring program. We have got to be able to have the information that is going to be necessary to base the management decisions upon and the livestock stocking rates, at the end of this monitoring period. You have heard throughout, that we need to simplify the procedures. I think that there is a lot of bearing in that. I think that we need to collect the necessary data evaluate stocking levels which is going to be one of the first things to do.

Before we can determine or even begin to determine how many cattle or sheep can graze upon an allotment, we have to know how much rainfall fell there. I think I perceived in some of the talks and words that I've heard in the halls, that a generalized rainfall collection process might be adequate. Down in New Mexico, we do not feel that this is really appropriate. Rainfall patterns are very scattered, some areas will receive a tremendous amount of rainfall, while others will receive very little. I think it is very important that a rain gauge be placed at a point where we establish these transect areas, these permanent study plots. I think that, in itself, will remove all doubt in having to guess, project, or average, because you will be studying an area where you know a given amount of precipitation has accumulated. You will be able to study the amount of forage produced, and the variety of forage produced. Not only is the quantity of rainfall important, but the time of the year in which it falls is very important.

I have experienced the difference in forage production in my travels with our "range con" in our allotment. I now have a better understanding of what is produced, and how it is produced. This is why it is very important to have these rain gauges placed at the study plots. Many times, the rain will fall either during the dormant season where you get very little production, and sometimes it will fall during the growing season where it will provide a variety of. species.

Forage production is also the measurement we must have before we determine the stocking rates and the quantity and variety is always important. I can always relate this to one of our rancher friends who was hung up on this key species thing that everyone talks so much about. He asked me several times, "What difference does it make what an animal eats, as long as he is productive?" He related that back to a man who can eat cornbread and beans and can go out and accomplish the same workload that a man eating a T-bone steak and caviar can accomplish. So I question that the key species concept is as important as being able to evaluate the various species and amount of forage value provided by all. Utilization is important and one of the hardest things for you people in the Bureau to come up with. You have to have actual use, and you have to know how many numbers are out there. I know that a lot of ranchers, due to circumstances beyond their control, are reluctant to give you actual pasture by pasture numbers. Sometimes the correct number of animals are not always in those pastures and they are fearful at some point in time that you may come and require a count or you may fly over and count the animals and if they are not in there, or there is more in there than should be the permittee is charged with trespass. There may be a gate left open, or a fence knocked down or other factors that are out of the control of the rancher at that point in time, and will result in livestock not being in the proper place. I hope that through the collection of actual use, that if necessary we could use the license use because that should be the number of animals grazing on the allotment. This problem would be resolved with "after the fact" billing.

Of course we have heard here today too, that there are many other uses of the range forage. We have antelope, deer, jackrabbits, gophers, badgers, skunks, and a lot of other animals that have a consumptive impact upon the resource. It is hard for me to determine what proper levels of stocking should be when you have all of these other

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variables for which we do not have anything other than an estimated number by the fish and game department. There again, I think that the ranchers themselves may be able to give a more precise number of the species they have seen grazing on the allotment.

Trend is highly important, and I am glad it has been included and so much emphasis put on it. Having lived on the same ranch for 50 years, I have seen a trend but have no way of measuring that trend other than within in my own mind. I have an area, where a lot of homesteaders have plowed up the flat overflow lands. After they left, there was a considerable amount of weeds, predominantly cockelburs, inhabiting the area. We tried in every way we knew, to eliminate the cockelburs and restore that country into grass production. We were finally successful after we had aerial spraying of 24D herbicide. Many of the homesteads we have watched, gradually improved from a farming area back into a grassland. I have seen the trend after the development and distribution of water where we don't have the impact of the livestock concentrated around the limited water resources that we had when I first began observing what was happening.

I guess my message is that the permittees have a lot to offer, and can be a valuable resource to you folks evaluating the resource. I think it should be a mandatory requirement that you contact the permittee before going onto the allotment, and encourage his participation and communication with you. I think this will expedite your time when you are out there. In many ways he will be able relate to you some of the occurences that have developed over the years, grazing patterns that have existed over time, and what has happened with installation of various improvements within the timeframe that he has been there. A valuable source of information is something, if times don't change shortly, we are going to lose on these rangelands. A lot of the old established families are going out of the ranching business and I think that we are going to lose the expertise that they have developed on those lands. It will be hard for any of us to ever go to school long enough, or be able to stay on a place long enough to be able to understand what that allotment is capable of producing. I would encourage you to do everything you can to encourage the participation of the permittee. We are certainly going to be doing that from the livestock industry standpoint.

In the selection of the transect plot, I think th permittee can contribute a lot to helping you decide the best location for it. I would encourage you to do this in every respect because I think you will reestablish the communication that is so vital and necessary between the land managing agency and the permittee. I would hope that we don't get bogged down in trying to gather so much data in order to defend our position in court, that we lose sight of the importance of th consultation process. I think if you and the rancher and the other land owners within the allotment can come to an agreement as to the procedure of monitoring and the stocking rate recommendation based upon the monitoring, that you are going to be in a much stronger position to go to the courthouse if we are challenged.

I'd like to tell you about section 8. In 1978, during the hearings for the Public Rangeland Improvement Act, several of us went to Washington and lobbied. We were successful in getting a Section 8 provision included in that legislation. It basically sets forth, in statutory form, the opportunity for all the landowners within an allotment to be called collectively together in a decision making body to make the decisions upon the developments that are going to transpire upon their property. I think it has helped us. I know as a livestock industry representative it has helped me to communicate and have a thorough understanding of all of the needs under consideration by the various landowners within the allotment. Down in New Mexico we have also established, by state statute, our Range Improvement Task Force team. The Range Improvement Task Force team is made up of highly qualified doctors within their various disciplines and used to assist the landowners or land managers in problem areas or areas where an agreement is hard to come by. We can call in an unbiased group who can bring to the attention of everybody, some of the things that we may have overlooked or we may not have been able to understand due to some other circumstance that may have prevailed. Section 8 is something that I think every state should have. Experimental stewardship is good, its a way to bring people together in a communication effort, but Section 8 has more body to it. I think it should be used more because we in New Mexico have developed policy procedures which are working to the benefit of all land owners. I would recommend that other states adopt New Mexico's Section 8 policy so all land owners participate in the decision making process.

I pledge to you the support of the industry for the monitoring program and would ask you to join hands in the most logical approach to range management.

CLIMATE/WEATHER

Stan Coloff

PERSPECTIVE-THE ROLE OF CLIMATE ON BLM MANAGEMENT

Climate has long been recognized as an important and often dominant factor which influences almost all resource management activities in the Bureau. However, only a few efforts have been undertaken to use climate/weather information in a quantitative manner to support or justify resource management decisions.

In the past few years the importance of climate information and our ability to use climate information has become more evident as climate data from remote, site specific monitoring stations has become available. Stations such as RAWS (Remote Automatic Weather Stations), Omnidata, and others.

The data from these stations show great seasonal and annual variability of climate in the West, particularly in much of arid and semi-arid areas managed by the Bureau. This variability is certainly not news to anyone, but the ability to assess this complexity of climate on remote areas of the public land is now becoming available for use in planning, rangeland management, prescribed fire and fire supression, range improvements such as seedings and vegetation manipulation, watershed improvement soil erosion control, wildlife habitat, emergency fire rehabilitation and various other activities.

In addition, there is the growing realization that weather information from the Weather Service Station at the local airport, although valuable, is simply not an adequate indicator of the climate/weather conditions on Bureau lands 30 to 40 miles distant or even 10 miles away in many instances where rugged terrain is an influencing factor.

CLIMATE USERS SURVEY

About 2 years ago, several of us in the Air Program recognized the need to take a broad look at the many scattered climate and weather activities in the Bureau. A study in the form of a survey was proposed to provide broad management oversight on how the Bureau acquired and uses climate/weather information in these various activities.

To provide this look at the Bureau's climate activities a Climate Data Users Survey was developed. This survey asked each of the Field Offices to provide information on their climate activities.

They were asked to:

1. List the climate/weather stations they operated, the location, parameters measured, and period of record.

2. List the climate and weather sources outside the Bureau that they used.

3. List how they used the climate/weather data by program and activity and additional needs for climate/weather data that weren't being met.

Bill Wagner, Utah State Office Air Specialist, headed up the survey which was completed last year. The results of the survey are just about complete and will be helpful in answering key management questions such as:

1. What climate information products need to be developed for BLM needs?

2. What systems, guidance, and training are needed in the field to implement and facilitate better use of climate data?

3. What climate data storage and retrieval systems are needed?

4. What standards for data quality and cross use among Bureau programs are needed; that is, how good does data need to be; what use can be made of BLM data by others?

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5. What are the opportunities for coordination and cooperation with other agencies, both Federal and State, and in particular, other Federal land managers?

It is interesting to point out that the FS is going to do a Climate Data Users Survey in Fiscal Year 1987 much the same as the Bureau did.

COOPERATIVE APPROACH TO CLIMATE MONITORING

A coordinated approach to climate monitoring is going to be very important. A coordinated multi-disciplinary approach can reduce overall costs for all Bureau programs.

A coordinated approach can provide better climate data; better in terms of quality and in terms of representativeness and suitability for Bureau applications.

CLIMATE/WEATHER TECHNICAL REFERENCE TR 4400-6

The need for a Climate/Weather Technical Reference has been recognized for some time and that need has been reconfirmed by the Technical Issues Work Group and other work groups this week.

Over the last several weeks, we have gotten a good start on the outline and text. The plan to develop the climate technical reference may be a little ambitious, but our target is to have a final draft ready for field office review by September 30 of this year. Bill Wagner , of Climate Data Survey fame, is up next to present the outline for the climate/weather technical reference and to present some views on the role of climate in Rangeland Monitoring.

CLIMATE/WEATHER AND RANGELAND MONITORING

Bill Wagner

Climate is one of the most significant factors influencing native rangeland vegetation growth, particularly in the rangelands of the west where precipitation and temperature can often become not just the driving force but also a limiting condition to native rangelands and establishment of improved rangelands.

The old euphamism is true that everyone talks about the climate and about the weather but nobody can do much about it. That's true from that standpoint, but, it also points out the hazards or the problem that we have of accepting climate as a given because it's there, we can't manage it, and we can't control it. Forecasting weather even a week in advance is an uncertain science at best. It would be nice to know on the basis of this years climate data that the related production or condition could be predicted next year and the year after, but we know that that isn't feasible. Considerable variability exists in annual, seasonal, and even daily weather parameters such as temperature and precipitation. The vegetation on native rangelands react to averages. Vegetation reads the micro-climate on a daily basis and does not read average parameters. It is reading extremes such as maximum and minimum temperatures, not just average precipitation as well as distribution of precipitation. We know that there is a lack of climatic data in many of the remote areas that BLM manages. On the rangelands that we are trying to monitor and work with, long term weather service data are oriented to population centers. There are volunteers providing data to the weather service that are on ranches and other facilities, but still those areas can be remote to areas of specific BLM interests. It is often difficult, if possible at all to interpolate or extrapolate from an existing long term data base to a remote area that we might be interested in, particularly in complex terrain where extrapolation of a few miles can be risky. There is limited knowledge in how best to apply climate data parameters to make management decisions.

All of these limitations should not imply that we are not using climate data; we are. The climate data user survey showed a large range in the application of climate data and of climate parameters to management decisions. But nonetheless, there is limited knowledge in how best to apply those climate parameters to management decisions.

Recognizing that climate is a significant influence on vegetative growth, particularly in the native rangelands of the west, it is desirable to use climate in the most quantitative way possible in making resource management decisions. Any range site that you look at or that you are investigating is a result of largely three parameters. Those three parameters are climate, livestock grazing, and soils. Now in some areas and in various years other factors can influence vegetation such as pathogens, insect grazers, wildlife grazing, and fire. Of those variables or influencing factors, soils can be considered a constant. Soils do vary from site to another, but over time soils at a specific site remain constant. Pathogen influences, insect grazing, animal grazing, wildlife grazing and fire are controllable, livestock grazing is manageable, but climate is uncontrollable. Climate is unmanageable, variable, and marginally predictable. If climate is one of the most significant factors influencing native rangeland community growth, and if grazing management is controllable, manageable, and largely predictable, then it necessarily follows that a better understanding of the relationship between climate and weather influences on plant growth and production needs to be obtained in order to select key climate parameters to apply to rangeland monitoring activities and decisions.

To know where and how appropriate data can be obtained and how to develop a data base is important. Depending upon particular objectives that we are after and how intensively we need to bring climate to bear on those objectives and we need to have a systematic way of incorporating climate data into the analysis, interpretation, and evaluation of rangeland monitoring

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information. This is not to say that there is a systematic cookbook way that climate can be used in every case. A BLM objective must be to provide guidance in terms of determining what the pertinent weather parameters are, how and where to obtain those parameters, how to utilize the parameters, and how to make decisions based on climate data.

Guidance is provided in the present technical reference documents on climate data application. The technical reference series needs to be supplemented in order to more effectively use the climate data we have available to us and to make some decisions on whether we need to monitor for additional parameters.

The technical reference document on climate and monitoring needs to be a working document. It needs to identify the climate data parameters that are pertinent to rangeland monitoring, provide guidance on how to apply climate parameters to rangeland monitoring, where to find climate data, and how to make some assessments of how good those data are. It should discuss the generation and archiving of climate data, how to analyze and interpret present climatic data, and discuss the use of available models to predict vegetation growth. The following is a proposed outline for the climate/weather technical reference document.

I have provided a handout on sources of climate data taken from a paper that was done for BLM by Dr. Tom McKee who is the State Climatologist for the State of Colorado. Dr. McKee's paper discussed the application of climatic data to mineland reclamation and was an excellent approach in my opinion. I have included in that handout a list of state climatologists that are available in each state. I would recommend to you who have not worked with the State climatologist that you avail yourself of their capability. They probably have the best information and the most complete data base available for the state. They can also help in interpreting those data and help you assess the accuracy of those data or the appropriateness of those data for the particular area that you are looking at.

SUMMARY

In the west; climate, particularly temperature extremes and precipitation amounts and distribution, often becomes the limiting factor to native rangeland growth and reproduction. Given a specific western rangeland site, the two most significant factors influencing condition and trend are climate and livestock management. This simplifying assumption which can be broadly applied minimizes the influence of diseases, grazing by wildlife (insects, rabbits, deer, elk, etc.), and fire which can become significant factors in some areas. Favorable climate years (above long-term normals) can make a poor management plan appear effective. Conversely, unfavorable climatological years (below long-term normal) can make a good management plan appear flawed. It is necessary to understand the climate/vegetative growth relationship for rangeland monitoring sites and be able to effectively apply climate data to management decisions. Climate is variable and only marginally predictable; therefore, it is also necessary to understand the relationship of climate to plant growth to select key climate parameters (those exerting the most influence either independently or collectively) for monitoring, analysis, and application to management decisions. Ultimately, with an adequate understanding of the relationship of climate to vegetation growth, the climate variable could be subtracted from the climate/management equation leaving management for examination related to the condition and trend of rangeland sites.

A technical reference document should be prepared to supplement the Rangeland Monitoring guidance. The document should present methods of identifying key climatic parameters and to provide guidance in the application of climatic data to rangeland monitoring analyses, interpretation and evaluation. The guidance would include the development of climate profiles for rangeland monitoring sites, climate analyses needed to address monitoring activities and related problems and opportunities, identification of climate data sources, interpretation of climate data, methods for climate data generation, and the use of models that describe climate and vegetation growth relationships. Methodology described by McKee et al. (1981) could be used. The document would be intended for use by field personnel with limited knowledge or background in climatology but with a need to factor climate and weather relationships into the rangeland monitoring activities.

ADJUSTING CATEGORIZATION AND PRIORITIZATION

Jerry Townsend

In order to concentrate available funding and personnel on areas where management action is most needed, BLM now uses the selective management approach. This will allow BLM to set priorities for improving resource conditions, resolving serious resource conflicts, and to invest in range improvements yielding the greatest benefit.

The major emphasis on management will be on "I" category allotments. The "I" category allotments are those where one or more of the following conditions exist:

1. Unsatisfactory range conditions.

2. Conflicts with other resources.

3. High potential for improvement is evident.

4. Other site specific criteria developed for specific areas.

The criteria for categorization should have involved public input and must involve the public in monitoring for progress and the recategorization to an "M" category allotment at some future point in time. In order to determine the monitoring strategy for an "I" category allotment, an analysis must be made of why an allotment is in the "I" category and what intensity and types of studies are necessary to determine progress being made towards attaining the goals and objectives for the allotment.

Our method for reporting progress to the public and interested parties is the Range Program Summary (RPS) and subsequent updates. These reports must report the progress being made toward resolving the problems associated with individual allotments.

In order to determine progress, each allotment must have established goals and objectives. To determine change, some parameters for change must be set. In the case of a change in ecological condition class, the time frame may be difficult to establish. Climatic conditions during the monitoring period may skew monitoring data during periods of extended drought or periods of above normal moisture.

Some examples of standards that can be established are:

1. Reduce utilization from 80 percent to 50 percent on key forage species.

2. Improve condition class from low fair to high fair.

3. Change season of use.

4. Others

Each of the standards should have a time frame for achieving progress. Some time frames may be relatively short for achieving progress (change in season of use), while other may require a long period of time (change in condition class).

Some management changes which occur rather suddenly may create other problems, therefore, an analysis must be conducted with regard to the anticipated results before the action is initiated. This may be the case where the season of use is adjusted. In every case, all actions involve full coordination with all permittees, other Federal and State agencies, and interested parties.

In order to recategorize an allotment from an "I" to "M" category, an analysis must be made of all monitoring data. Several questions must be answered satisfactorily before the category is changed. Some of these questions are:

1. Have the standards for change been met?

2. Were the monitoring studies conducted over a statistically sound period of time?

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3. Did the changes in management create problems with other resources?

4. Is it likely that the position changes are permanent, or only for the short term?

5. Has the full potential for improvement been realized?

6. Under the current management, it is likely that the allotments will maintain its current level of productivity and condition class?

Monitoring studies should be continued on an allotment following recategorization, to the extent that the studies are conclusive that the goals and objectives have been met and the category change was proper.

Once an RPS has been issued, a priority for action on individual allotments must be established. This sometimes brings out differences in opinion as to priorities for initiating the first work to be accomplished. In areas where grazing conflicts with wildlife use, the BLM biologist naturally wants the first priority to be resolution of the conflict as soon as possible. The permittee, on the other hand, wants any reduction in livestock numbers to be the last priority for initiation.

Several points must be considered in setting priorities for action. Some of the points to consider are:

1. The seriousness of the problem.

2. The time frame for resolving the problem.

3. Whether resolution of the problem requires the expenditure of Range Improvement Funds.

4. Where can we get the greatest results with the least expenditure of funds? (Highest B/C status.)

5. Whether the allotment contains other high priority values that must receive first consideration.

Due to limitations in funds and personnel, the priority for establishing monitoring studies should follow the points discussed above. The first priority for monitoring should also be on those allotments which rank high in priority for first action following the RMP/EIS.

DECISIONS FROM MONITORING DATA

Larry Humphrey

In the Safford District, we started writing Allotment Management Plans in 1975 and initiated the Upper Gila-San Simon Grazing Environmental Statement in 1976. After two long years, the EIS was published in September of 1978 and the Range Management Program Document was issued in 1979.

The job was to now send out decisions adjusting grazing on 204 Section 3 and Section 15 grazing allotments including some 223 different allottees. This is a formidable job even with the best of data to back you up. The problem was that we had no data. The District had a 1936 range survey completed by the Soil Conservation Service. It was probably a pretty good survey, but all we had left from it after 40 years was the maps. All the write-up sheets had been lost. Our State Office decided that the survey was a little old to use anyway. We found some surveys that had been done in the early 1960s, and we had done about 200,000 acres of ocular reconnaisancc survey in 1974 and that was all we had to cover the 2.3 million acres of land in the EIS area (approximately 1.3 million acres were public lands). At the start of this process, the District authorized about 180,000 AUMs. The EIS had livestock carrying capacity figures published in it, but you couldn't say that they were reliable. An Area Manager, the District Range Specialist and myself took to the field to do a windshield survey of each Allotment in the District. In about two months, we completed the first District-wide range inventory since 1936.

The data in the EIS on range condition, erosion, benefit/cost analysis, and wildlife numbers was gathered in much the same way. This was done, not because we didn't want to get real data but because we were under the time restrictions of the Court ordered EIS schedule. As you can see, for data necessary for grazing decisions, we were out of luck.

In 1978, we received some new grazing regulations, which had finally been released based on the Federal Land Policy and Management Act of 1976. These new regulations stated that the reductions in livestock grazing specified in the EIS would be implemented immediately in the form of Full Force and Effect decisions. This meant that each allottee would have to take his full reduction at the start of the next grazing year. Any privileges that the allottee had over the carrying capacity would be cancelled.

Since the EIS estimated a 33 percent overall reduction in livestock grazing or 57,000 AUMs, and some allotments were to receive better than 70 percent reductions, we weren't in the best of positions, with no real data on livestock carrying capacities. We asked for money to start a new range inventory. The request was denied. We were told that if we had guts enough to put our estimates of carrying capacity in the EIS then we would damn well send out decisions on the same basis. Not a terribly good Washington Office decision but we were not really surprised, considering some of the other decisions we had gotten.

In 1979, we sent out about one-third or 47 decisions, made them full force and effect, and cancelled any privileges over the carrying capacity. These decisions were carefully screened and most of them involved no, or only minimal reductions, and were on allotments that had carried substantial amounts of non-use for years. (Substantial means, I didn't know the right number and was too lazy to look it up). We received twelve protests and no appeals on this batch of decisions.

These were easy decisions. As I said before, we were denied money to start a SIM or SVIM inventory. That didn't really matter because we didn't like the methodology, or have the time it took to get SVIM done. We also decided that a SVIM inventory probably wasn't any better than our previous windshield survey. In our windshield survey, we simply skipped the maze of calculations associated with SVIM and went directly to the guts of the matter, the livestock carrying capacity.

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The first idea we had to provide real data for decisions, was to do a quick and dirty weight estimate survey using the old 1968 4410 Manual. That was not one of our better ideas. One little piece of desert came up with a carrying capacity of 32 cattle yearlong per section. For you northern people, that's about 1.7 acres per AUM. Now we knew that there wasn't one acre in the whole planning unit that had that kind of carrying capacity. After trying to weigh cactus and other plants with lots of thorns, we decided then and there that any range inventory method used in the Southwest that depended on some weighing plants that wasn't any good. We still stand by that decision.

After the weight estimate fiasco, we decided to call our friendly Land Grant University, the University of Arizona, at Tucson, Arizona and tell them our problems. We talked to Dr. Lamar Smith and Dr. Phil Ogden and outlined the situation. They had been such outspoken critics of SIM that they decided they needed to have some positive input for a change. We all went to the field and tried out a utilization mapping system. With a few refinements, it looked pretty good. We began to gather some real data on the allotments for the first time in the entire process.

In 1979, we initiated the utilization mapping system on all the allotments we thought would appeal, and on those that were taking substantial reductions. This covered almost 100 allotments. By this time the regulations had changed again. The new version required us to give the allottee a maximum of three years to phase down to the correct number of livestock and any privileges over the capacity would be held in suspension rather than be cancelled. We sent out this next batch of 59 decisions and received 13 protests and 4 appeals. Off to court we went, and we won those appeals with one to two years of monitoring information.

In 1981, fresh on the heels of change in administrations, the regulations changed again. Now allottees were to have five years to fully accomplish the livestock reductions and they were to take effect at one, three, and five year increments. Also, the allottees were allowed to appeal the decision at the one, three, and five year intervals. Any privileges in excess of the carrying capacity would be held in suspension. BLM was also required to monitor each allotment to determine if the proposed reductions were justified.

After a series of exciting meetings in the District and in the State Office, we were allowed to issue the last 66 decisions. These were the really tough nuts in the District. Most of these allotments were facing reductions of over 50 percent and the allottees were the type that ate Bureau people for breakfast. Out of this last batch of 66 decisions, we received 12 protests and 6 appeals. We were finally ready for court. We had at least three years of utilization data on each allotment. Sure enough, we lost one of the decisions.

In 1985, we issued 34 decisions, which were decisions altering the final livestock numbers in the 1981 decisions (these were not all increases, just cleaning up loose ends). No protests or appeals were filed. We finally got the original task of balancing livestock use with the carrying capacity completed, six years after the Range Management Program Document was published. Our initial estimate was for a 57,000 AUM reduction. We have actually reduced 30,000 AUMs. The number would be much closer to our original estimate, but we have exchanged land in over 18 grazing allotments to the State of Arizona and have therefore lost control over them. Of all the people that worked on the EIS and the grazing decisions, only three people remain in the District that followed the process through from start to finish.

The Utilization Method developed by the University of Arizona and the Safford District is not high tech, nor is it really new. The only basic item needed is that the range conservationist in charge of an allotment really know the allotment. That seems very basic, but since the Bureau goes from one pseudo-crisis to another every few minutes, it is sometimes hard for the Range Conservationist to get out on the ground enough to learn the country.

I will briefly outline the method. Using aerial photographs, topographical maps, and knowledge of the allotment, the allotment is divided into areas that will receive similar use by livestock. These use zones are then checked by on-the-ground transects of one-half mile or more each in length. The use zone lines are changed according to the findings in the field. The acres in each zone are multiplied by the actual use of a key species in each zone. Then the Range Conservationist has to decide what the use should be in each zone, given differences in topography, water, fences and vegetation types. Each zone is then given an allowable use and this figure is multiplied by the acres in the zone. The figures for each zone are then totaled for the allotment. These totals, (Actual Use x Acres) and (Allowable Use x Acres), are then used in a proportion using the actual AUMs of use made on the allotment, to arrive at the "proper" stocking rate.

There are several assumptions made using this method. One, that the management of the livestock will remain relatively the same. Two, that the kind and class of livestock will stay the same, and three, that we have a pretty good idea of the actual use made on the allotment during the year. I must add that southeastern Arizona is somewhat different than many BLM grazing districts. We don't have any critical winter range for wildlife. We have no wild horses or burros to worry about. Most of the operations are operated yearlong. Bulls are left with the herd yearlong and many of the roundups are nothing more than catching or trapping the dumber cattle as they come in to water. Arizona is a water base state and the allottees don't have to own land for their cattle to come home to. Consequently, actual use figures are sometimes nebulous, at best. If we didn't have a good record of actual use, we used licensed use.

Let me give you an idea how the system works. First, the Range Conservationist that supervises the allotment makes the first rough cut at use zones using his knowledge of the allotment, aerial photographs, topographical maps, and allotment maps. Then, about the middle of May or the first of June, the Range Conservationist gets into the front seat of a helicopter and gets six other people to go with him. He tells the pilot where to set each of the people down on their transects and manages the operation that day. Usually two people are ferried to their transects at a time. All six people are set down on their individual designated areas and leapfrogged around the allotment until all use zones have transects run in them. By using a helicopter, we can run about 30 to 36 transects per day. We try to limit the helicopter to 4 flight hours per day because its primary purpose at this time of year is fire suppression and we need to leave some flight time for fire fighting. Another reason is that after running six long transects, the personnel need a rest. Usually 36 transects will be sufficient to cover an allotment of about 35 to 50 thousand acres.

We don't use just range conservationists to do the transects. Each year, we have a one-day training session for the people that might help out. Wildlife biologists, realty specialists, natural resource specialists, and any other warm live body that can identify different species of plants are trained. We use the key forage plant method for utilization but we have found, through actual trials, that any method gives the same results if enough observations are made on each transect. We have found that at least 30 observations, on the most abundant palatable species, are the bare minimum for accurate results, and 50 are desirable. This usually translates into a transect one-half to three-quarters of a mile long.

If stocking rates were the only reason we were doing this utilization study, it would not be very cost effective. We have found that we can use the data to determine the proper placement of key areas, spot areas of poor livestock distribution, and locate areas that need range improvements. It also can help when we talk to allottees about their livestock management systems.

Each year, we invite the allottee to participate in this study, either in the helicopter, on foot, or on horseback. Less than 10 actually go out with us, but when we get the data compiled we usually meet with him and explain the method, show our results, and discuss his situation with him. The allottees in our district have not objected to our study, but they don't always agree with the allowable use limits we impose. We did receive some criticism from the Grazing Advisory Board about our extensive use of a helicopter. This criticism was from allottees that didn't bother to go on the studies with us. Anyway, we used their own argument against them by getting the Advisory Board to furnish a horse for the District.

The goal we try to reach in our program is to average 40 percent use on the key species. Research done on the Santa Rita Experimental Range south of Tucson has shown this to be a reasonable goal. We realize that in years of low precipitation, utilization may reach 60 percent and in years of high rainfall, utilization may be only 20 percent. We need this conservative utilization limit because extended drought is a reality in our part of Arizona and we need to protect the plants for that eventuality. This also leaves enough vegetation for wildlife use for both food and cover, so no wildlife allocations have to be made. The wildlife biologists in the District have tentatively agreed with this approach.

Sometime during this lecture, I am supposed to tell you how to write "quality" decisions. I gave you the preceding history of our efforts to show that you don't really have to have all the information about everything before a decision is issued. In my mind, the basic ingredient of a good decision is guts. The personnel in the District, not just the managers, have to have the will to issue the decisions, based on available, always imperfect data. Many times BLM personnel criticize their managers for not making a decision. I believe that if the staffs of an Area or District want to do something, it's pretty hard for an Area Manager or District Manager to ignore them, if they have well thought out solutions and if they are united in their efforts.

In our District, we tried to write short, clear, decisions. The basic item we were trying to do was to reduce livestock grazing. We left out extraneous thoughts in our decisions. We didn't mention issuance of term permits, terms of the AMP, or other items that were not pertinent to the subject of livestock numbers. We didn't tell the allottee what a good cooperator he was (even if he was). We simply told him that he had too many cattle on his allotment and we were going to reduce those numbers.

A good decision shouldn't come a surprise to an allottee. The Area Manager and Range Conservationist should have met with him several times before a decision is actually issued. The Range Conservationist shouldn't let the allottee think the decision is the sole product of the Area Manager. That is, the Area Manager shouldn't be the bad guy with the Range Conservationist supposedly trapped by the workings of Bureaucracy. If the allotment needs a reduction in livestock numbers, the Range Conservationist should be up front in his beliefs to the operator.

If available data shows that a given allotment needs a ten percent reduction, and the information used to show it has a standard deviation of fifteen percent, don't try to reduce the allotment by ten percent. Know the limits and uses of the data you have. We realize that our Utilization Method has several weak points. For each decision appealed, we tried to determine the weak points and fill in the gaps as best we could. No Decision issued is ever perfect! For hearings, I believe it is a good idea to have the solicitor run through the testimony expected from each person some time before the actual hearing. Tell the personnel testifying to be positive.

We started work on the EIS in 1975, and have undergone numerous changes. We have had three State Directors, three District Managers, the Gila and the San Simon Resource Areas have each had three Area Managers and we have went through lots of Range Conservationists. As I have previously mentioned, we have also gone through three major changes in the grazing regulations.

Why has our program succeeded? There are several reasons for this besides pure dumb luck, although luck helps. First, the core of the District personnel has remained unchanged. The Supervisory Range Conservationists have stayed the same, as has the District Range Specialist and several other of the key personnel. Second, as a District we were dumb. We thought that we had to obey the letter and spirit of the NRDC lawsuit and that we had to follow the grazing regulations. We were too stupid to realize that if we designed complicated studies we would never have to issue the decisions. We could just monitor the world falling apart. Third, we wanted to get something done. We felt that studies are sometimes used to delay decisions that may be unpopular. It's easy to say that you don't have enough information, or that the budget is not fat enough, and hope the basic problem will go away by the time you transfer out of the District.

Our entire decision process has not been quite as smooth as I have pictured it. For instance, we spent weeks shuttling to and from the State Office getting concurrence on the precise wording of the decisions. Would you believe the tenth and final version looked suspiciously like the first draft? The transient District Managers and Area Managers have been a continuing problem. We have to retrain each one and get their egos settled down before we can pick the process up where we left off. Each new manager believes that he can work successfully with the sorriest, meanest, crookedest allottee in the District. We have a couple of allottees that we keep around just to train new managers with.

In closing, the best advice I can give about the whole decision process is to have patience, keep a good sense of humor, don't get caught selling missiles to Iranians, and never, never sign anything with your real name.

QUALITY CONTROL THROUGH FIELD REVIEWS AND ASSISTANCE

Bob Stager

With this presentation, I hope to illustrate to you that quality is a realistic possibility in the Bureau of Land Management and can actually increase the quantity of monitoring and management implementation completed.

INTRODUCTION

It's been a little over ten years since the Federal Land Policy and Management Act took effect and enhanced the Bureau of Land Management mission. We have faced the challenges of land use planning and inventory and completed them. We now face another challenge. Getting management on the ground. The thing we all have been striving for.

Can we meet the challenge? I believe we can. Monitoring, range improvements, management systems, decisions/agreements and working in the field are the better parts of the job ahead of us.

Monitoring, the reason we are all here now, is an integral part of management implementation that tells us what changes in existing management are needed and whether the new management has met its objectives.

When we first started the monitoring push in 1980 to 1981, many looked at it as a way of postponing making decisions or side stepping the resource issues. I disagree with that thought. We needed a firm foundation on which to build decisions not just theoretical information. With monitoring we have laid that foundation. Since we make up the professionals hired to manage the public lands, we have within our capability the means to use monitoring as the tool it was meant for. Provide public land managers the information needed to manage the resources. The question is will we strive for quantity or quality in our monitoring efforts? I believe we can have both.

The Bureau has within its ranks some of the best, highest qualified and dedicated resource managers. I arrived at this conclusion over the past seven years traveling through ten western states and serving on numerous task forces with dedicated individuals from those states. With this type of people resource, there is no reason why the management problems ahead of us should not have solutions, whether they come easy or with a little sweat.

NEVADA APPROACH

At the Nevada State Director's instruction in 1980, the resources staff in the BLM's Nevada State Office began to address this quantity versus quality concern. We helped develop minimum standards in field monitoring techniques as a part of the Nevada Rangeland Monitoring Task Group comprised of academia, other state and federal agencies, and private range consultants. The procedures were reviewed by the field and implemented in 1981. The next step was to develop and field test allotment analysis, interpretation, and evaluation procedures, and to implement them in a timely fashion. Follow up with local training and assistance on the "how to" was necessary. We at BLM developed computer programs to analyze the data, a systematic approach to evaluating an allotment, and Allotment Management Plan handbook guidance.

One of the things we heard most often when we started was "Those guys don't need training or assistance. What did they go to college for." Our State Director did not agree with that sort of logic and gave us the support we needed to continue. Once we had the standards, we had a yardstick to measure and promote a different critter called "quality."

QUALITY CONTROL FIELD REVIEWS

In 1984, the Nevada State Office initiated annual Resource Area level quality control field reviews and assistance. Our feeling was that most Bureau employees wanted to do work they could be proud of.

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What was needed was a positive indication that management was supportive of quality efforts and was not just there to talk about it. So we designed the State Office field reviews to stress quality, development of realistic objectives in quantity, and to promote active involvement of field personnel in monitoring and management policy development. In order to enhance a team effort between the State Office and the field, we did not and do not use the reviews as a way to criticize the field, but rather to work with them to find solutions.

The result is that the monitoring and management standards established are not the State Office edicts or dogma, but rather field office products. Additionally, the Districts now request State Office assistance in training and team problem solving. It is not a District monitoring or AMP problem but a state problem, so let's solve it.

The field review process itself checks to see if the direction taken by an office has gone through coordinated planning, is in compliance with national and state policy, is technically adequate and is consistent. The review requires the use of numerous field procedure handbooks, knowledge of methods, land use plans and other documents to review grazing plans, monitoring plans, proposed management actions, and on-the-ground field applications.

PARALLEL WITH THE PRIVATE SECTOR- QUALITY AND QUANTITY

At this point, I would like to stray away from the Bureau for a minute and discuss an example of the emphasis of quality in the private sector.

If I mention the name Ford, what comes to mind? Mustang, tractor, dependable pickup? If you watch television, the commercials have done a pretty good job of linking the word "quality" with Ford's Idea Machine in the minds of the media. It hasn't always been that way. How about the old saying, fix or repair daily?

In 1980, Ford was a collection of rival fiefdoms and internal politics positioning for power. Divisions tended to hand off problems from one division to the other as an exercise in fault finding. Executives were more interested in running their careers then running the company and promoting quality. Sound familiar? As a result, Ford was losing an average of one billion dollars per year producing the infamous "fix or repair daily" American car shunned for the higher quality foreign imports.

Ford decided to change. They asked their designers to design and build quality cars they could be proud of. The result was the hottest car on the market today the TAURUS, a higher quality image and product, production levels equal to those in 1978 with 27 percent less employees, and profits of 2.5 billion dollars in 1986. The highest profits of any American auto manufacturer in 1986! They were told that it could not be done.

THE RESULTS IN NEVADA

In Nevada, we established monitoring and management standards and guidelines in 1981 and initiated quality control field reviews and assistance in 1984. Six years have elapsed since adopting this direction. The results have been that the Districts have met or exceeded their units of accomplishment in inventory and monitoring since 1982 and the quality of the monitoring and inventory products have met and often exceeded the standards as determined from the reviews.

Looking at units, since that is the tangible way the agency rates progress, in 1985 every District updated their 1981 monitoring plans to reflect allotment evaluation schedules, the plans were reviewed and approved by the State Office. We increased from 13.7 million acres of high quality order 3 soil survey to 34.4 million acres or about 74 percent of the 46 million acres of public lands in Nevada. Acres of ecological status increased from only 800,000 to 13.5 million or 29.3 percent of the public lands equating to an increase of 1500 percent from 1981.

In relation to monitoring, it is established on 19.9 million of the 29.2 acres million of the high priority "I" allotment. The I or intensive category is the highest priority of the three selective management categories used by the BLM to prioritize and focus its monitoring and management efforts. The other categories are M for maintain and C for custodial management. This amounts to 68.2 percent of the I's with monitoring. The total acres monitored of the 46 million are 28.6 million or 62 percent.

In our decision/agreement efforts, we have issued 152 in total with 42 on I allotments, 53 on M, and 56 on C. While many of the more difficult decisions are still ahead, we feel we are making progress, having only recently (1987) completed the planning process on all the environmental impact statement areas.

CONCLUSION

This record shows that by establishing standards, stressing quality, and following up with quality control field reviews and assistance the BLM just as Ford has, can have quantity with quality in monitoring and managing the public lands.

THE PROFESSIONAL CONDITION OF BLM RANGE MANAGERS

Kendall L. Johnson

INTRODUCTION

About 120 professional employees of the Bureau of Land Management are gathered here this morning, a representative sample of BLM's range staff west-wide. You are beginning the fourth day of an intensive, and by all accounts worthwhile, workshop on rangeland monitoring. The workshop coordinators have advised me that you are probably sated with things monitorial. Indeed, Glen Secrist, the man who arranged this address, has told me that he wouldn't care, and is sure that you wouldn't care, if I didn't even mention the word monitor. So I won't, except for incidental reference later. Rather, our mutual charge this morning is to explore the professional condition of range managers in the Bureau. The analysis is my own, and represents personal opinion of a professional colleague outside the Bureau. While many may find things to argue with in this perception, still I believe that the main elements will find major agreement among the range managers here. There are grounds both for an informed concern and a cautious optimism.

BRICKBATS AND BOUQUETS

None of you needed to journey to Denver to have me recite some of the litany of brickbats directed at BLM. From all sides surrounding any issue they come. BLM is the proverbial man in the middle: tolerated by most, respected by few, loved by none. If it is difficult to find bouquets but brickbats range from faintly suspicious to downright scurrilous. An all-too-typical example is found in a 1985 edition of Audubon Action, under the title 'Overgrazing: Making a Wasteland of the Western Range,' by Brock Evans. The third paragraph avers:

> This is a sad tale of more than a century of government policies to subsidize cattle and sheep ranching on the public lands at the expense of nearly everything else: wildlife, recreation, even the water and soils. Our public agencies are driving the wildlife off the land-- and replacing it with cows and sheep."

While this paragraph and the article which contains it are rife with inaccuracies and misperceptions, it reflects the opinions of a good many environmentalists that range managers in general and BLM in particular are up to no good. Worse, the other side of the grazing issue--the livestock permittees--are equally disdainful. For instance, the moderator of a recent poorly-attended producer meeting staged by BLM in Utah--himself a livestock permittee--matter-of-factly explained the low attendance by the fact that he had warned fellow ranchers that they would hear only more BLM lies and distortions if they came.

As on the grazing issue, so the drumfire continues on many others, not least the wild-horse controversy as reported in the FS-BLM 6th report to Congress on 'Administration of the Wild Free-Roaming Horse and Burro Act.' Here again BLM is in the no-man's land between warring factions, caught between concurrent lawsuits which allege on one hand that 'BLM, through inaction, was allowing wild horses to overpopulate the public lands resulting in "ecological imbalance" and on the other that "the BLM's roundup, possession, and transportation of excess wild horses and burros are cruel and inhumane."'

A similar story could be told across every multiple resource, use and value within the purview of BLM management. The tales make one wonder whether anyone or anything likes or approves of BLM or its employees. Of course, such, even most, of the hostile commentary is inaccurate, misdirected, occasionally fatuous and nearly always unfair. Yet there remains a kernal of self-generated responsibility for the malaise that currently affects so many BLM personnel.

SOME REASONS

Nearly everyone in this room will remember the Director of the Bureau once removed, Frank Gregg.

Presented January 15, 1987 at the Bureau of Land Management's Rangeland Monitoring Workshop, Golden, Colorado.

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Many of you may also remember a gathering called a Mid-Course Review, held February 5, 1980 in Salt Lake City, to take stock of BLM policy on rangeland management in the era of court-ordered EIS's. Some of the remarks of Director Gregg on that occasion are instructive:

> 'I spent most of last week with the charter members of the National Public Lands Advisory Council in their first meeting. And after three days of intensive briefings on issues ranging from the MX Missile to the Sagebrush Rebellion one of the members observed that it seemed to him that we were "conflict managers," not "resource managers" and that we'd have to have a building full of Solomons in order to sort them all out. Obviously, we are both resource *and* conflict managers, by the nature of our statuatory mandate, and--even more obviously--we do *not* have a building full of Solomons.'

In 1987, the dichotomy of being resource *and* conflict managers continues, but the background against which it is cast has deteriorated further. There has been some failure to deal with the essential elements of conflict management. In doing so, BLM managers have proved themselves not only to be Solomons, but have abandoned the high ground from which they might defend their status as professional range managers. An analysis of this assertion reveals three main causative factors.

1. *We need data.*--In the years since 1980, BLM appears to have developed an overreliance on what I choose to call the techniques of range management. This has probably been prompted by the understandable need and desire to have 'evidence that will stand up in court,' because it appears that nearly every major BLM decision will be challenged legally. And so there has been a ceaseless search for data and more data, for increased precision, for statistical reliability, heedless of the costs or even the possibilities of staff, budget, and time. To an increasing degree, the search for technical adequacy has entailed a corresponding retreat from professional judgment. This process was foretold by Director Gregg in 1980 in assessing BLM's application of grazing suitability criteria:

> 'Arguments that there are important factors such as seasons and patterns of use, class and kind of livestock, opportunities to provide water and opportunities to modify grazing systems which should be fully considered before applying suitability adjustments are all reasonable. In fact, our instructions to the field emphasize that each area has its own characteristics and must be evaluated carefully when making judgments as to suitability. Unfortunately, there are instances where this has not been done.'
>
> 'There is substantial concern, also over the allocation process itself, particularly where the computer is used to compile and manipulate field measurements. There is real fear that the "black box" will turn a biological process requiring judgment into one that is purely mechanical. I share these concerns. Automation can be of tremendous benefit in increasing efficiency but it cannot substitute for the *human element*. We all have to be sensitive to the fact that computer outputs are no more reliable than the data that goes into the system and the *products have to be interpreted and applied with professional judgment*.'

2. *The fear of uncertainty.*--The tangible loss of faith in professional judgment--the kind which interprets and applies the available data to a real-life situation that cannot be described in quantitative terms--is perhaps the surest charge of non-professional practice leveled against BLM managers. All range managers do well to remind themselves from time to time that range management is much more of an art than a science and that, given the complexity of the biological systems with which we must deal, it will remain so. There is no substitute for professional judgment, founded in training, illuminated by experience, and tempered by common sense. That kind of judgment, by the way, is legally defensible as well. Where BLM managers have gotten into trouble is not using professional judgment well.

3. *A kind of thinking.*--The search for techniques and the loss of judgment have interacted to form a kind of bunker mentality--an 'us against them' posture that has been ruinous of BLM standing. The posture has worked to isolate BLM from many sources of support on all sides of rangeland issues, often egregiously unnecessary loss. BLM managers must remember that in any fundamental sense, they do not manage resources *per se* but rather they manage people. As F. E. *Busby* reminds us,

if we don't do the latter sufficiently well, there is no way to even approach the former. I am reminded of an example from my own state of Utah. Back in the days of SVIM, a BLM survey team drove day after day through a ranchyard on their way to and from the allotment they were surveying. Never once did they stop to say hello or inform the rancher what they were doing, much less invite his presence or seek his assistance. This poisonous fruit spawned by this neglect did not become evident until much later, at a public hearing, when an embittered, hostile rancher could not even listen to, much less evaluate, the BLM proposal. The fact that the rancher could have changed the human equation through his own action does not relieve the BLM crew chief of primary responsibility. I wonder if that crew chief ever knew how much his form of 'bunker mentality' damaged the BLM or how costly it was to public range management. The adversarial climate created by a bunker mentality is as hostile to professionalism as a Great Plains blizzard would be to a hot-house flower. They simply cannot coexist.

WHAT ARE SOME CURES?

The definition of a professional has been, and will continue to be, open to debate. Don Dwyer, former head of the Range Science Department at Utah State University, has thought about the characteristics of a professional in some depth, and has developed a 15-point list defining a practicing professional. These are too extended to consider fully here, but some of the points are germane to our concern.

The first characteristics on Dwyer's list speaks to the overreliance on techniques. Simply put, professionals:

--Know what they don't know.

Notice, there is no admonition about quantitative or even qualitative information here. Quite the contrary; professionals should, indeed must, avail themselves of all the information available bearing on a particular problem or point of decision, but must keep the line between what is known and unknown in clear focus at all times. Particularly, professionals do not try to stretch the known cover to cover the unknown through such subterfuges as undue extrapolation, refusal to consider possible compensating factors, or taking refuge in data processing. For instance, Jens Jensen of the Utah State Office and I were recently ruminating on the regrettable tendency of many BLM managers to ascribe a truth value to processed biological data it simply does not have. Computers can crank out analyses of numerical information in as many decimal points as desired, giving the appearance of precision that is seductive. But professionals must remember the nature of the input data. Computers may tell us that the proper grazing load for an allotment is 98.5 AUMs, but we must remember the nature of the survey from which the input data was generated. Further, we must always remember that in a biological system that is both complex and adaptable, the number may be no different in practical result than say, 88 AUMs or, for that matter 108 AUMs. What is the proper figure? That is something for professional judgment to answer, which alone can consider the complex interactions of allotment characteristics, other uses and values, the variations of livestock numbers, class and season, and the myriad other factors that may be involved. The main thing to remember is that the computer has given us an indication of where the grazing use should be, another tool to be employed in a flexible consideration of the overall situation.

As to the loss of faith in professional judgment, Dwyer posits several characters of a professional that are germane:

--Can deal effectively with uncertainty,

--Can have ideas and written materials criticized without taking it personally,

--Can keep personal opinions and bias at a minimum when not supported by sound evidence,

--Is capable of compromise,

--Can develop a set of alternative solutions--not just one.

Professional judgment conducted under these guidelines stands the best chance of coming closest to the whole truth of a management situation on rangeland. For a simple reaffirmation of belief in the utility and necessity of judgment, note its wide practice by nearly everyone concerned with a range issue, and frequently not very well founded at that. That's where you come in: to render a professional judgment. Who is better qualified as a group than people holding professional degrees and having professional experience?

Finally, I would add a character to Dwyer's list of professional characteristics that is an antidote to bunker mentality, to wit:

--Knows how and continues to learn better how to deal with people.

The study of dealing with people effectively should be a career-long pursuit of every BLM employee because ultimately one's facility at doing so will define, more properly, it can be practiced. The rules and elements of doing so exceed out present purview, but generally it can be thought of as developing as many points of human contact between you and those you work with as possible. This can range from a quiet coffee with a permittee to being a 4-H leader to helping with community projects to being a responsible member of the local service club. Anything to develop human contacts beyond the strictly regulatory mode of BLM practices so that when disagreement comes, as inevitably as it must, it can be resolved on other bases and through lines of communication that the naked police venue.

AN ANALOG

Probably, one of the best analogs to what I am urging here is found in medical practice. Consider the doctor's approach to your presentation of an ailment. First you are pumped for background information and then the affected parts are checked with whatever diagnostic tools that seem appropriate, ranging from a tongue depressor to a cat scan. With the pertinent data marshalled (note that the data-gathering process is in direct relation to the severity of the trauma), the doctor then exercises a professional judgment first on what is wrong with you, second on what the management program (treatment) should be, and third, on the overall prognosis for recovery. This program is then carried out with varying degrees of efficiency, frequently under one or more monitoring schedules. All of this is communicated to you in some manner, varying with the individual doctor and situation. We tend to trust most the doctors we know best, or failing that, those who communicate with us most skillfully--the famous 'bedside manner.' And note that the doctor must operate under economic, social, cultural, and institutional constraints.

If the doctor was reasonably correct in data gathering, analysis and interpretation, and if the biological system at hand (you) doesn't behave or react in unpredictable ways, success is usually forthcoming. Sometimes the doctor misses a symptom or misinterprets its significance, sometimes misjudgment occurs, sometimes the treatment is misapplied, sometimes constraints are met. None of this stops the practice of medicine. Good doctors try to profit from the experience, thereby becoming better doctors. Through it all, the essential operative element is the professional--the training, experience, and yes, judgments that make it all possible. And the same distinguishing factors apply to the profession of range management.

CONCLUSION

Can you do it? The answer is yes. There are about 120 professional range employees of the Bureau in this room. The combined weight of the accumulated training, experience, and knowledge here is almost tangible. Use it! The organization will be only as good as your collective strength properly applied. Seek out and analyze the appropriate data correctly, apply the result to the situation at hand and when you find it is insufficient, as inevitably it will be, exercise professional judgment, bringing all of your training and experience to bear. And then communicate the results to the other players as honestly and sincerely as you can. Then remain resolute but open. You won't always be right but as a professional you'll be closer to being right from day to day and situation to situation than anyone else.

In the last analysis, the largest and most significant contribution to the management, productivity, and health of the public lands placed in your care must come from you--the range professionals. That is as it should be.

May I express to you my personal thanks and those of other range professionals for your present and future effort. I will express that by a personal applause and invite you to join me in expressing to each other your appreciation and support. Stand up and clap.

FINAL REPORT OF THE WORK GROUP ON: MONITORING POLICY

Jens Jensen
Work Group Chairman

I. Issue 1 - Guidance for the Issuance of Decisions and Agreements following a grazing EIS or Resource Management Plan (RMP).

A. Analysis - There is confusion surrounding the timeliness of issuing decisions and agreements following a grazing EIS or RMP. Questions seem to rest on two points regarding decisions. The first point is: Is a decision necessary following a Range Program Summary (RPS), which will set forth a monitoring plan, layout specific goals and objectives and put the permittee or lessee on notice that adjustments in livestock use may be made following 5 years of monitoring studies? The decision may also discuss the management categories ("M", "I" or "C") in which the allotment has been designated. The second point in question arises in situations in which inadequate data is available, 5 years after the RPS has been issued, to determine a proper stocking level. This situation may arise because the studies have not been established for the full 5 years or the data is unreliable for one or a number of reasons.

B. Recommended Action - Adopt the strategy illustrated in Figure 1 to comply with W.O. Instruction Memorandum 86-706 regarding the monitoring program and the issuance of Decisions and Agreements following an ROD/RPS.

II. Issue 2 - Monitoring Reports: Definitions and Requirements for Reportable Units.

A. Analysis - The definition of a reportable unit and the time frame involved have created many real and/or perceived problems for offices responsible for reporting monitoring accomplishments. Definitions of reportable units have not been well understood by many employees. Field offices have consistently complained that frequent changes in the reporting of monitoring accomplishments have led to increased workloads, employee confusion and lowered morale and possible inconsistencies in information being reported.

B. Recommended Actions -

1. Re-emphasize to field offices the national level reporting requirements, the rationale for making the reports (who uses and who requests) and make a management committment not to change the requirements or format without close consultation with field offices.

2. Require State Directors to define reportable units and time frames for field offices.

3. Clarify the reporting requirements definitions in the Fund Coding Handbook to be consistent with the national level reporting requirements in regard to studies actually completed during the report year. Ensure that Financial Management reports only include the studies accomplished during a year rather than showing the total allotments and acreages with established studies.

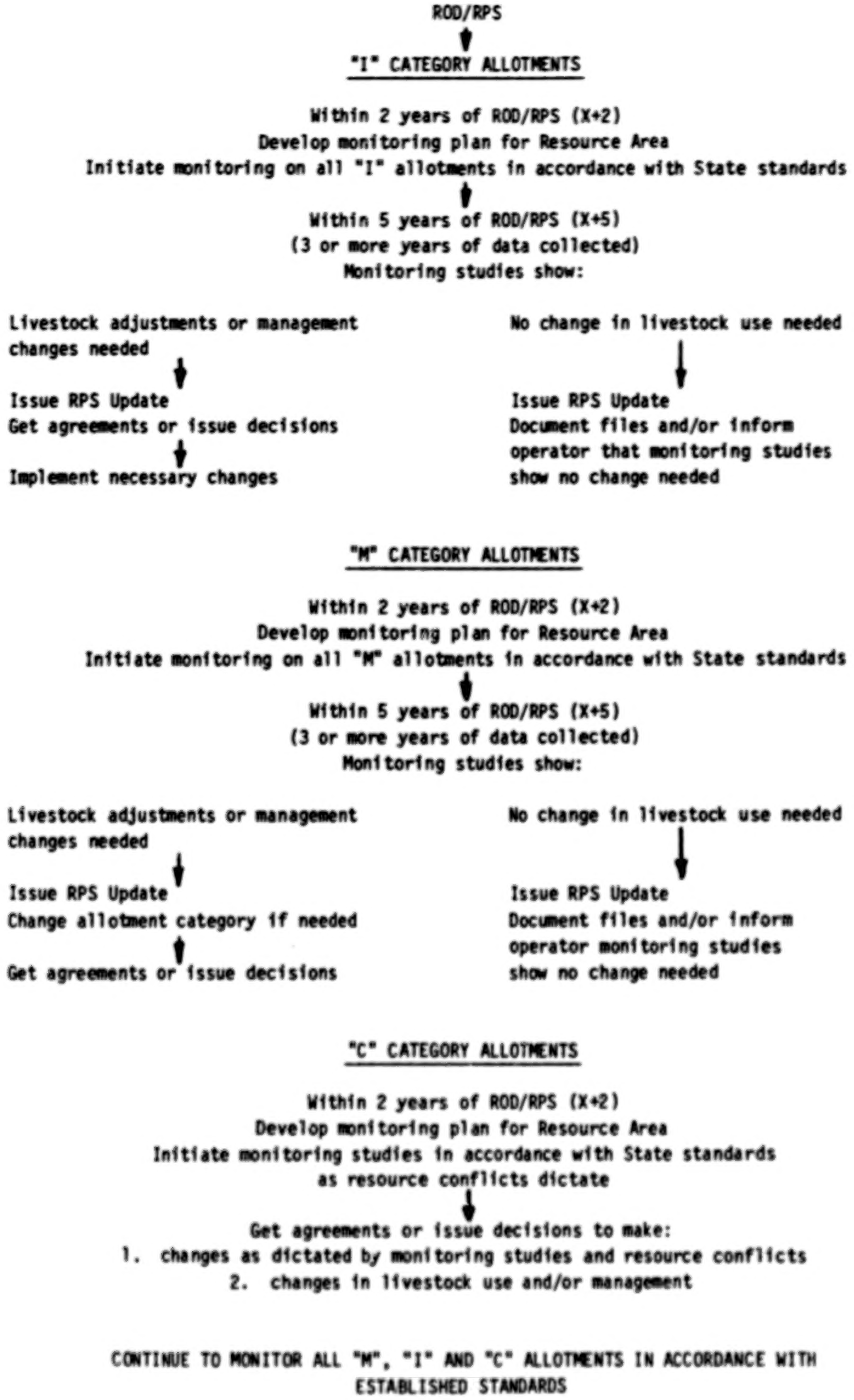
III. Issue 3 - What is the process/rationale for changing allotment categories?

A. Analysis - The purpose of categorization is to concentrate funding and on-the-ground management efforts on those allotments where grazing management is most needed. To assure that available funds and manpower are expended on those allotments with the highest priority and that the intensity of monitoring is consistent with its resource conflicts.

B. Recommended Actions -

1. Through the State Directors, establish minimum standards for monitoring "I", "M", & "C" category allotments. These standards should include procedures for prioritizing allotments for monitoring within the "I" Category.

2. Washington Office should reemphasize that recategorization of allotments should be done only after monitoring studies show that resource conditions have changed and that based on the original categorization criteria



ROD/RPS

"I" CATEGORY ALLOTMENTS

Within 2 years of ROD/RPS (X+2)
Develop monitoring plan for Resource Area
Initiate monitoring on all "I" allotments in accordance with State standards

Within 5 years of ROD/RPS (X+5)
(3 or more years of data collected)
Monitoring studies show:

Livestock adjustments or management changes needed

Issue RPS Update
Get agreements or issue decisions

Implement necessary changes

No change in livestock use needed

Issue RPS Update
Document files and/or inform operator that monitoring studies show no change needed

"M" CATEGORY ALLOTMENTS

Within 2 years of ROD/RPS (X+2)
Develop monitoring plan for Resource Area
Initiate monitoring on all "M" allotments in accordance with State standards

Within 5 years of ROD/RPS (X+5)
(3 or more years of data collected)
Monitoring studies show:

Livestock adjustments or management changes needed

Issue RPS Update
Change allotment category if needed

Get agreements or issue decisions

No change in livestock use needed

Issue RPS Update
Document files and/or inform operator monitoring studies show no change needed

"C" CATEGORY ALLOTMENTS

Within 2 years of ROD/RPS (X+2)
Develop monitoring plan for Resource Area
Initiate monitoring studies in accordance with State standards as resource conflicts dictate

Get agreements or issue decisions to make:
1. changes as dictated by monitoring studies and resource conflicts
2. changes in livestock use and/or management

CONTINUE TO MONITOR ALL "M", "I" AND "C" ALLOTMENTS IN ACCORDANCE WITH ESTABLISHED STANDARDS

Figure 1. Strategy For Monitoring and Grazing Use Decisions.

the allotment should now be in another category.

IV. Issue 4 - What can be done to build more accountability for completion of the monitoring committment into management?

A. Analysis - Managers at all levels may not be fully aware of the Bureau's committment to rangeland monitoring and the need for making management decisions based on the results of monitoring studies.

B. Recommended Actions -

1. Designate a Monitoring Coordinator at the State Office, District Office, and Resource Area level; this could be "dual hatted" with the SO or DO Range Conservationist.

2. Conduct periodic Monitoring Reviews by the State Office and/or the District Office to assess monitoring implementation, inspect monitoring files for completeness, discuss interpretation and analysis of monitoring studies, and develop strategy for applying monitoring data in the decision-making process.

3. Require that a Monitoring Plan be prepared for each land use plan area or Resource Area. The plan should include the following information as a minimum:

a. Allotment name and number by category.
b. Resource components to be monitored.
c. Monitoring technique to be used.
d. Brief description of the techniques or procedures to be followed.
e. Frequency/interval for performing a given technique.

V. Issue 5 - Monitoring Report Format

A. Analysis - Managers at the Washington, State, and District offices all need to know the progress being made toward meeting management objectives outlined in the planning and EIS process. Since reporting will be a continuous effort, we must have a standard format that will allow Districts to update the information required as changes occur. This data can be automated and be recalled quickly so requests for information can be responded to by District personnel without having to spend a lot of time compiling the data due to changing formats.

B. Recommended Action - Adopt the format(s) for reporting monitoring progress as shown in Manual 4400.7 (Table 3) except revise the apparent trend as shown in Table 2. The monitoring report formats should be placed in BLM Manual H-4420-1 (Rangeland Monitoring and Evaluation).

Allotment Or Office	Total Federal Acres	Trend						
		Apparent			Monitored			Unknown
		Up	Static	Down	Up	Static	Down	Total Acres

Table 2. Proposed Range Condition Reporting Table.

FINAL REPORT OF THE WORK GROUP ON:
CORRELATING MONITORING TO LAND USE PLAN OBJECTIVES

Larry Walker
Work Group Chairman

I. Introduction - The draft report identified five issues:

- Lack of clearly defined objectives.
- Relating specific activity plan objectives to broad land-use plan objectives.
- Setting measurable or observable objectives and monitoring those objectives.
- No action.
- Two monitoring priorities without enough capability to do both.

The work group did not address the issue of capability because that issue was more properly being addressed by the policy work group.

The work group combined the first two issues. In retrospect, the first three issues can be combined.

II. Issue 1 -Setting and monitoring site specific objectives within the contest of the more generalized land-use plan objectives.

A. Introduction - Offices have been experiencing some difficulty in bridging the gap from generalized land-use plan objectives to site specific objectives and monitoring. This appears to be more of a problem with RMPs than with MFPs. There was also considerable concern about areas that are not covered by activity plans.

B. Analysis - The underlying issue appears to be managing and adapting to change. There did not appear to be much of a problem in areas where the sequence of events was:

1. Develop the MFP (relatively site specific).

2. Develop the activity plan.

3. Monitor the activity plan.

This approach does not address areas that are not covered by activity plans, but the BLM had little general guidance for such areas before 1983. BLM Manual 1734.24 and 1734.25 address the coordination of monitoring with multiple-use and activity plans. The statement in 1734.25 that "The monitoring and evaluation plan may be included in an activity plan" (emphasis added) may have misled some to believe that these manual sections only apply to areas with activity plans.

In 1984, BLM began phasing-over from MFPs to RMPs, and BLM Manuals 1611-1619 were released. RMPs prepared under this guidance are issue driven and in some aspects are less site specific than MFPs. This tended to exacerbate any real or perceived gap between the land-use plan and site specific objectives and monitoring.

BLM Manuals 1620-1625 (11/14/86) were in the process of being distributed and were not available to the work group. These Manual sections provide supplemental program guidance that will substantially reduce the gap between land-use plan objectives and site specific objectives and monitoring.

C. Recommended Actions - Adequate guidance now appears to be in place to "bridge the gap." BLM Manuals 1620-1625 provide guidance that will improve the statement of objectives in land-use plans. BLM Manual 1734 contains guidance on monitoring and evaluation plans that will complete the bridge and provide documentation of site specific objectives, monitoring techniques, and schedules.

BLM Manual 1734.25 should be strengthened to make it clear that the monitoring plan conceptually precedes activity plans and is refined as appropriate following development of activity plans. A reference should be added in program specific manual sections that address monitoring plans (such as 4400.22) that reference the reader to the 1734 manual.

III. Issue 2 - No action.

A. Introduction - The draft report referenced a perception that there may be some reluctance to take action.

B. Analysis - The work group felt that, to the extent a few managers may be reluctant to take action, adequate procedures are in place such as functional evaluations, MBOs, PIPRs, and so forth.

The work group believed that a far more common situation may be that a manager may be viewed as reluctant to take action when, in fact, there is not adequate documentation to provide a basis for a decision.

C. Recommended Action - Technical Reference 4400-7, "Analysis, Interpretation, and Evaluation" provides guidance that facilitates adequate documentation for supporting a management decision.

The work groups on Technical Issues and Information and Education have developed recommendations for improving this technical reference and providing training. Those recommendations are endorsed by this work group.

FINAL REPORT OF THE WORK GROUP ON: CORRELATING MONITORING TO INVENTORY

Donald Cain
Work Group Chairman

I. Introduction - The Work Group met in Reno, Nevada during the week of November 17, 1986. Three major issues were identified and discussed in detail. Those issues are:

A. The role or importance of the ecological site inventory is not recognized in the rangeland management program, especially as a component of monitoring.

B. Many BLM employees do not understand the similarities between the Soil-Vegetation Inventory Method and the Ecological Site Inventory.

C. Current rangeland reporting does not accurately portray the field situation.

The following is a discussion of each issue, along with a set of recommendations aimed at resolving the issue.

II. Issue 1 - There is a perception among employees that the Bureau does not recognize the role or importance of Ecological Site Inventory (ESI) data in the resource management program, specifically as a component of rangeland monitoring.

A. Introduction - As a result of this perception, there is a lack of commitment and support dollars to complete ESI. A lack of inventory detracts from the quality of our monitoring efforts. In most cases, where inventories have been completed, they are not routinely used.

B. Analysis - How could this happen? Because of the emphasis on planning, many employees consider inventory only to be needed for that effort. Also, because of short time frames for planning, some inventories were not completed to the minimum Bureau standards.

When the Bureau issued direction that a one time inventory was inadequate for making adjustments in grazing use and that management decisions would be based on monitoring, the field perception seemed to evolve that inventory was not required or needed any longer.

Although current BLM policy indicates the need and uses of inventory data, with the lack of commitment, no mandated direction, lack of accountability, and inadequate funding, BLM personnel continue to perceive no need for inventory and that it is not needed or would not be used in our management of the public lands. Also, we need to remember that FLPMA and PRIA require the Bureau to maintain a current inventory of the public rangeland. There is concern by some, that there is no policy requiring the use of inventory data.

ESI is an essential multiple-use management tool. However, because of the lack of understanding or knowledge about it, the following points are listed:

1. It is the basis for establishing resource capabilities and potentials.

   a. Documents a site's capability to produce different kinds, amounts, and proportions of vegetation.

   - Identifies ecological site and its present seral stage.
   - Identifies site potentials.

   b. Gives the manager a tool to identify resource problems and values.

   c. Helps identify areas capable of indicating measurable change.

   - Sites dominated by woody species(i.e., Pinyon-Juniper) are not likely to change with grazing.
   - Cheatgrass and some other annual dominated communities are not likely to change with grazing, especially under certain climatic conditions.
   - Sites in late seral stages that can only be maintained or lowered in ecological status may not be indicative of activity plan objectives.

d. Provides a basis for formulation of realistic management objectives within the capability of the site. Activity plan objectives must be attainable within the potential of the site and within a given time frame.

e. Provides objective and quantitative documentation to support management actions.

- Activity plan evaluations
- Grazing decisions
- Implementing activity plans
- Land use planning
- Project development

2. It provides baseline data for monitoring.

a. Data needed for the identification and quantification of "important" sites.

- Sites of significant size and distribution.
- Sites of high productivity (diversity, quality and quantity of species) Total productivity, i.e. meadows, riparian areas
- Forage production by species
- Sites with unique values:
  Threatened and Endangered Species
  Fragile Soils
  Areas of Critical Environmental Concern
  Research Natural Areas
  Wilderness Study Areas

b. Data useful in locating key areas that are in fact "representative".

- Provides criteria for stratification
- Range site
- Condition class
- Present vegetation (vegetation type) within condition class
- Similarity and variability within strata
- Provides credibility for key area concept through documentation (inventory)

c. Baseline data from which to measure changes.

- Key area objectives
- Activity plan objectives
- Land use plan objectives

d. Baseline data useful in geographically delineating use areas for livestock and wildlife by range site and condition class.

- Present vegetation
- Slope/aspect
- Stoniness, Rock Outcrop, etc.
- Elevation

e. Data that can serve as a common frame of reference between resource specialists and agencies.

- Common terminology
- Standardized techniques
- Data sharing

3. It is the basis for predicting or extrapolating the results of management alternatives, research applications, and monitoring data between similar sites. For example:

- Conversion in kind of livestock
- Grazing systems
- Season of use
- Range improvements
- Designation of critical or crucial wildlife habitats
- Predicts effects of prescribed fire
- Used to assess need for fire rehabilitation
- Predicts probabilities for success of rangeland seeding
- Effects detected on key areas can be expected to be similar throughout a stratum

4. It provides data useful in the objective categorization of allotments through identification of:

- Seral stages
- Potential productivity
- Overall allotment condition
- Resource problems

5. Provides a consistent data base for required rangeland condition reporting systems (Federal Land Policy and Management Act and Public Rangelands Improvement Act).

C. Recommended Actions -

1. Reaffirm the Bureau's goal of completing ESI. Place greater emphasis on the relationship and importance of ESI data to effective rangeland monitoring.

2. Strengthen policy:

a. Require adherence to minimum standards for ESI by all field offices. Stress the flexibility available to field managers to supplement the minimum data with other data necessary for local planning and decision-making.

b. Require managers to make long-term commitment to inventory as a baseline for monitoring and other management activities.

c. Stress that there will be no new planning starts involving renewable resources without minimum standard inventory (ESI).

3. Encourage State Directors to assure that minimum standards are being met and that inventories are correlated among district and between states.

4. Address importance of inventory in a Rangeland Monitoring Handbook.

5. Prepare a Technical Reference on the concepts and role of ESI in the rangeland management program.

6. Train managers, range conservationists, wildlife biologists, and others on how to use ESI data.

7. Include multiple resource input when preplanning for inventories to ensure that the product is of the greatest possible benefit. WO Budget and procedural directives should continue to recognize the multiple resource needs for ESI and encourage State Directors to fund ESI from benefitting activities.

8. Strive for a logical approach to inventory by conducting ESI after or concurrently with a soils inventory correlated to ecological sites.

III. Issue 2 - Bureau employees need to understand the similarities and differences between the Soil Vegetation Inventory Method (SVIM) and the Ecological Site Inventory (ESI) and their value to monitoring.

A. Introduction - Some managers and field people do not recognize the similarities and differences of data requirements for these two methods. This becomes obvious when we find out that some inventories (ESI) are being conducted without collecting vegetation air dry production data. This must have been the conclusion that some personnel drew from WO Instruction Memo No. 83-340 that archived some SVIM reports and stated that the computer allocation program (Administrative Report) was no longer available; the data should not be used to establish initial stocking rates or for any related use; and would not have grazing decisions based on SVIM grazing capacity estimates or forage allocation printouts. This memorandum pointed out that existing SVIM data may be used to determine ecological range condition, and also that the Range Sites Inventory Method outlined in the Soil Conservation Service National Range Handbook was adopted as an approved Bureau inventory method.

B. Analysis - The effect of this misunderstanding is that, in some cases, we are spending inventory dollars and are not getting the minimum amount (e.g., production air dry weight) of data needed for an adequate vegetation baseline. Species composition by air dry weight is needed (and is the BLM standard) to identify potential (ecological site), seral stage (ecological status), and to delineate present plant community.

The most significant difference between these two inventory methods was the overall concept or their intended product (Figure 1). The concept for SVIM was that data would be gathered to the extent of accomplishing detailed activity planning with a capability of being able to make forage allocations. The concept for ESI was to adopt an accepted inventory method which would direct the collection of baseline data for planning and monitoring, but not attempting forage allocations.

As Figure 1 indicates, there are important similarities between the two methodologies dispelling the widespread contention that the Bureau is always changing inventory methods. These similarities enable the conversion of SVIM data to the Inventory Data System (IDS) on many previous inventories.

SVIM	ESI
Purpose of data was allocation of forage.	Purpose is baseline data.
Order 3 Soil Survey.	Same.
Range Site/Ecological Site concept.	Same.
Condition - Present community.	Same.
Production & Species composition by (air-dry wt.).	Same.
Clipping (overhang) vegetation that is only within plot.	Clipping all rooted vegetation in plot.
Required actual clipping for production data on each stratum.	Allows ocular weight estimates calibrated by clipping.
Characterization required (age, form, density).	Characterization not required but allowed, if needed.
Phenology, utilization, climatic adjustment factors used. Air dry weight correction factors calculated in computer.	Adjustment factors taken into account when recording on SCS Form 417. No utilization factor used. No climate adjustment factor.
No check can be made until after computer calculations.	Gross errors can be detected in field.
Identified as new "Bureau" inventory procedure rather than established procedure.	Long-standing Soil Conservation Service procedure.
Contains allocation parameters, e.g., suitability, proper use factors and Forage Requirement (lbs.)	No allocation parameters.
Computer calculated condition class.	Condition or seral stage determined in field.

Figure 1. Similarities and Differences Between SVIM and ESI.

Again, the documentation of vegetation species composition by weight, total vegetation production per acre, ecological site identification number, and ecological status, as prescribed by BLM Handbook H-4410-1, constitutes the BLM's minimum standards for a vegetation data base.

Of the 60 SVIM inventories on the DPS 8/70, 35 had adequate minimum data for conversion to ESI, and subsequent storage in IDS for query retrieval. This was accomplished in FY 86. The remaining 25 inventories do not have adequate data to allow for conversion to ESI under the existing software. There are also an unknown number of SVIM and Ecological Site Inventories currently not in ADP and therefore, not readily available for field use. This represents a multi-million dollar investment of public funds.

C. Recommended Actions -

1. Take immediate steps to make all personnel involved in ESI knowledgeable of the procedures explained in the SCS National Range Handbook of 1976 as supplemented by H-4410-1 and the User Guide for Inventory Data System (IDS) identifying the minimum data needed for this ADP data storage and retrieval system.

2. Require managers to adhere to the minimum inventory standards so that the minimum specified data needed as a baseline for planning and monitoring can be consistently collected and documented.

3. Reaffirm policy in BLM Manual 4400 - "it is the continuing policy of the BLM to conduct baseline rangeland inventories giving priority to areas where the greatest need exists."

4. Review existing inventory data (SVIM and ESI) to determine whether or not they meet the minimum IDS standards for ESI and to assess their potential utility to monitoring.

5. Evaluate the 25 unconverted inventories and identify the requirements to bring them up to ESI/IDS standards for conversion. Those remaining unconverted should be stored in a different data base if possible.

6. Instruct the Service Center to investigate the feasibility of developing an ADP program for storage of unconverted inventory data in a usable fashion.

IV. Issue 3 - Current rangeland reporting does not accurately portray the field range condition situation. Several types of data (from range condition reports over the years) have been mixed by BLM and others into one data set.

A. Analysis

1. Large percentage of reported acres are estimates.

2. Our credibility with the public is further compromised by reporting the condition of uninventoried acres as estimates.

3. Condition classes used in reporting now do not consistently reflect our management successes or failures. There is no way of comparing condition data to historical and current land use plan objectives.

4. Technical and procedural problems may be causing the public and BLM personnel to misinterpret range condition information.

5. Different condition classifications are being mixed for reporting purposes, e.g., livestock forage condition vs. ecological status, etc.

B. Recommended Actions

1. Proceed with efforts to revise "condition" reporting procedures to make them objective oriented.

FINAL REPORT OF THE WORK GROUP ON:
TECHNICAL ISSUES IN MONITORING AND INVENTORY

John Willoughby
Work Group Chairman

I. Introduction - The technical aspects of rangeland monitoring are of vital importance to the success of BLM's monitoring efforts. Decisions on the management of livestock grazing must be based on the most accurate and reliable data available. In collecting such data range professionals must be familiar with the methods available, the purposes for which each method is used, and the benefits and limitations of each method. Range professionals must be able to successfully design studies that will result in accurate assessments of progress toward meeting objectives. They must also be able to analyze and interpret the data collected. Finally, they must be able, using all sources of information and input from other BLM specialists, livestock operators, and others with pertinent knowledge, to evaluate progress made toward meeting objectives on particular allotments.

The ability of BLM's range professionals to do these things depends upon adequate technology transfer. The Technical Reference Series is a major and successful component of this. Training and information sharing are equally important; these, however, have not been given the attention they deserve.

Successful monitoring requires that individuals responsible for conducting studies recognize the importance of such studies. The motivation of many range professionals to carry out such studies is lacking.

Issues relative to motivation, training, and information sharing are more the domain of other work groups and will not be covered in detail here. It must be recognized, however, that the ability of BLM professionals to arrive at technically sound conclusions hinges on these factors.

The Technical Issues Work group was originally assigned the following six issues:

A. Review the 4400 Technical Reference Series and offer recommendations for new or needed TR's.

B. Thoroughly discuss the Analysis, Interpretation, and Evaluation process and its relationship to grazing decisions.

C. What are the appropriate levels (intensity and frequency) of monitoring on M, I, C allotments?

D. Should BLM studies be on all species (ecosystem/multiple use concept) or just key forage species?

E. Can field notes be the basis for a decision? (professional judgment).

F. Is the "Key Use Area" concept valid with short duration/deferred systems with grazing dates changing every year?

The following additional issues were added before or during our pre-workshop meeting held December 9-12, 1986:

A. Is there a pressing need for a Technical Reference on climate/weather?

B. What are appropriate levels of monitoring (intensity, frequency) on crested wheatgrass seedings?

C. Are studies to determine condition and trend appropriate on ephemeral rangelands? On Mediterranean annual rangelands? On cheatgrass rangelands?

D. How much time and money should be devoted to updating and revising Soil Conservation Service site guides? What priority should this have in the range program?

E. What can be done to improve technical training and knowledge transfer relative to monitoring?

F. How can we increase the level of motivation of range specialists to perform monitoring studies?

The work group decided that several of these issues are not in fact separate and could be combined with others. This consolidation resulted in five major issues. These six issues, ranked in priority order (with number 1 the highest priority) are as follows:

A. The role of Analysis, Interpretation, and Evaluation in relation to the grazing decision process is not clearly understood.

B. What are the minimum acceptable levels (intensity and frequency) of monitoring on M, I, and C allotments?

C. Review the 4400 Technical Reference Series and offer recommendations on additional needs.

D. There is currently some confusion regarding the concepts of key area and key species.

E. Can thorough field notes alone be the basis for a decision?

An additional issue was added during the meeting of the entire Technical Issues Work Group at the monitoring workshop:

F. Managers do not currently have sufficient flexibility to determine the methodology to be used in conducting ecological site inventories and determining ecological status.

These six issues will be addressed and analyzed in turn.

II. Issue 1 - The role of Analysis, Interpretation and Evaluation in relation to the grazing decision process is not clearly understood.

A. Introduction - Technical Reference 4400-7 was developed as a guide for field offices to use when completing allotment evaluations. This guidance has been used in the grazing decision process. However, feedback from the states indicate that many range specialists are not sure how to use monitoring data to assess progress toward meeting land use plan objectives and to arrive at stocking rates.

B. Analysis - The main purpose of a grazing decision is to correct a specific problem or problems with a resource on the ground. In order to issue a good decision, good data must be collected to show the need for and document any action. A most important part of this process is to carefully analyze, interpret, and evaluate the data to determine if proper management has been taking place or if management must be changed, in which case a decision must be issued to take some action to improve resource conditions.

The present TR 4400-7 guidance does not adequately address the situation when difficult decisions must be issued making downward adjustments. Someone with hundreds of photographs has little or no guidance except to say that they should be filed in some folder. It discusses climate but falls short of how to factor this extremely important variable into the final stocking rate or land use decision objective. The Sneva-Hyder climatic factor is mentioned in TR 4400-7, but users are not cautioned that this is only valid in southeastern Oregon. Although the various utilization formulas are a guide to determine stocking rate, range specialists should be cautioned not to depend only on these formulas.

At the end of the AIE process there is no example of a follow-up section for the manager to complete to show there has been some review and implementation of changes proposed in the evaluation. There has to be accountability by someone that the work necessary to improve management on the ground has been completed.

C. Alternatives -

1. Use only professional judgment. This alternative would save some time and money up front, but the end result would be fewer changes on the ground and more time spent in working up appeals and hearings information.

2. No change in existing guidance. Let each state do its own thing.

3. Use the AIE Technical Reference and update the document where guidance is lacking. This alternative will best meet the Bureau's objectives.

D. Recommended Actions - The committee recommends that range specialists continue to use the AIE TR and that it be supplemented or updated to stress and include the following items to help make better decisions.

1. Current feeling is that objectives for monitoring and AIE are only for AMPs. This is not the case. Objectives can be in land use plans, RPS's, monitoring plans, or on key management areas. This should be emphasized along with the fact that AIE should take place on all allotments, with or without AMPs.

2. The utilization formulas are a good tool to use as a starting point to develop stocking rates. However, the TR should include some discussion on the fact that specialists are not to become dependent only on the formulas. Other data such as trend photographs, etc., should also be used to develop stocking rates.

3. Climate is one of the major factors in the AIE process. Since weather is so variable and significantly influences rangeland condition and trend, a new TR on climate and weather should be completed to give field offices guidance in gathering and interpreting these important data.

4. Guidance on how to use and interpret photographs in the decision process needs to be added to the TR. The method used in the Vale District should be included as an example.

5. Continue to stress that good AIE requires a high level of interdisciplinary coordination and review to help make difficult recommendations for management decisions.

6. The TR needs to be expanded to include a follow-up section on management review and an implementation schedule for recommendations and decisions.

7. The TR should include more examples of how to display data. A spreadsheet used in the Gila Resource Area should be included as an example.

8. The TR should emphasize the importance of field notes and documented observations of ranchers and others regarding weather. Especially useful are those taken quarterly.

9. The TR should include examples on the use of task forces consisting of representatives of BLM, appropriate State and other Federal agencies, universities, Extension Service, and other interested parties in the development of monitoring methods and in analysis, interpretation, and evaluation. The experience of Nevada and New Mexico are good examples.

E. Action Schedule - With the emphasis that is currently being placed on monitoring and issuing decisions, TR 4400-7 should be updated by the end of calendar year 1987.

III. Issue 2 - What are the minimum acceptable levels (intensity and frequency) of monitoring on M, I, and C allotments?

A. Introduction - Appropriate levels (intensity and frequency) of monitoring have not been established on a Bureauwide basis. Recent instruction in IM No. 86-706 directs each state to establish minimum acceptable levels of monitoring; however, a coordinated Bureauwide approach has not been initiated at this time.

Appropriate levels of monitoring need to be defined so BLM will have adequate data available to identify when a change in management is needed and to supply adequate support that will uphold an administrative decision for a change in management.

B. Analysis - Funding for BLM's grazing management program has been declining over the past several years while at the same time new issues and demands have been placed on this program. These demands have limited our capabilities to do a complete job of managing the resource.

Intensity and frequency of gathering monitoring data have been looked upon largely in relation to BLM's funding and manpower or its "ability to get the job done." Determining how much data should be collected, and how often, is just as critical as choosing the methods used to collect the data.

Through the land use planning/RPS process, BLM has applied the selective management approach (categorization) to all allotments. This approach prioritized allotments according to management needs into (I) Improve, (M) Maintain, and (C) Custodial categories. The extent of resource deterioration, value of the resource, and level of associated controversy indicate the degree of emphasis to be placed on our management of each allotment. This relates to monitoring in terms of quality, quantity, and timeliness of data collection.

Washington IM No. 86-706 (Sept. 23, 1986) states: "Our monitoring objectives are to gather adequate data on all "I" and "M" category allotments to determine the effects of management actions on the rangeland resources and to provide quantifiable data needed to support management decisions." Also: "The frequency and intensity of data collection will vary with allotment category as well as among allotments in the same category. BLM Manual 1734 requires that monitoring be conducted at a level commensurate with the resource values, conflicts, and level of planned management--unnecessary data collection and analysis will be avoided."

The memorandum (86-706) directs each state to establish its own minimum monitoring standards. Bureauwide standards seem to be a more reasonable approach to assure we have a better balanced, uniform approach to our effort. The minimum monitoring levels proposed below take into consideration the fact that most management actions currently taken by BLM are on critical "I" allotments where downward adjustments in livestock numbers and/or changes in season of use are required. Few of these actions can be initiated without protests and appeals from the affected users. In these situations it is essential we have adequate data to (1) identify the action needed and (2) support the corrective action in a hearing.

On less intensively managed allotments where less controversy and fewer problems exist, we still need to gather enough quality monitoring data to assess progress and make necessary adjustments to ensure resource objectives are being met.

C. Alternatives

1. Continue present direction as given in IM No. 86-706. Each State is to determine minimum monitoring standards, including method, frequency, and intensity of data collection. This approach would result in inconsistent levels (intensity and frequency of monitoring) Bureauwide and could result in (1) some States winning court cases based on their monitoring data and other states not; (2) imbalance in workload and cost of monitoring from state to state because different intensities and frequencies require different levels of manpower; and (3) some states meeting monitoring commitments and others not due to differences in intensity of monitoring and manpower.

2. Adopt minimum monitoring levels (proposed in Table 1) on a Bureauwide basis. This approach would ensure each state is monitoring at the same level, resulting in consistent documentation to back decisions, uniform costs for monitoring, and a higher degree of credibility. Add minimum monitoring levels for soils, to be developed later by a team that includes soil scientists and hydrologists.

3. Do not adopt the minimum monitoring levels proposed in Table 1, but place them in TR 4400-1, Planning for Monitoring, as an example of standards that can be adopted by individual states. Include example minimum monitoring levels for soils.

D. Recommended Action - Alternative 2 is preferred. Implement and follow the Bureauwide minimum monitoring levels outlined in Table 1. If the decision is not to adopt the preferred alternative, the Work Group recommends that Alternative 3 be adopted.

IV. Issue 3 - Review the 4400 Technical Reference Series and offer recommendations on additional needs.

A. Introduction - The Technical Reference Series (TRS) was developed to provide the range professional with state-of-the-art guidance on the technical aspects involved in the monitoring process. The TRS can supplement the professional's existing knowledge as well as provide new ideas and information which can be applied to the monitoring process. It is important to stress: 1) that Technical References are a set of reference documents; 2) that Technical References do not set monitoring policy; and 3) that the professional is not restricted to using only what is printed in the TRS. However, the TRS should be as complete and comprehensive as possible so it will be used, and, therefore, additions and changes to the TRS need to be part of an on-going process (with input from field professionals).

B. Analysis - The existing TRS has become an important tool to the professional involved in

		ALLOTMENT CATEGORY		
Range Type	**Study**	I [1/]	M	C
PERENNIAL RANGELAND	Actual Use			(Licensed use)
	-Intensity	By allotment	As needed	
	-Frequency	Annually	As needed	
	Utilization			
	-Mapping	Upon study establishment, prior to AMP, and as needed thereafter	As needed	As needed
	-Methods	Locally determined	Apparent utilization	Apparent utilization
	-Frequency	Annually or biennially	Every 5 years	Every 10 years
	Weather	NOAA	NOAA	NOAA
		Additional as needed (Higher priority allotments will generally require more intensive data)		
	Trend			
	-Methods	Photo point + locally determined quantitative study	Photo point	Apparent
	-Intensity	1/pasture	1/pasture	N/A
	-Frequency	5 years	10 years (+ Apparent trend every 5 years)	10 years
	-All species or key species?	All species upon establishment; all or key species thereafter as needed		N/A
	Condition			
	-Methods	ESI	ESI	ESI
	-Frequency	Planning cycle or if evaluation indicates change in condition		
SEEDINGS	Actual Use			Licensed Use
	-Intensity	By allotment	As needed	
	-Frequency	Annually	5 years	10 years
	Utilization			
	-Mapping	As needed	As needed	As needed
	-Methods	Locally determined	Apparent	Apparent
	-Frequency	Annually with decision process	5 Years	10 Years
	Weather	NOAA	NOAA	NOAA
	Trend	Photo point		
	Forage Condition	Planning or evaluation cycle		
MEDITERRANEAN ANNUAL RANGELAND (CA)	Actual Use	As needed	As needed	As needed
	Utilization	No minimum standards		
	Weather	NOAA	NOAA	NOAA
	Trend	No minimum standards		
	Condition	Based on soil protection, presence of persistent undesirable plants, etc. ESI for any perennial components		
OTHER ANNUAL and EPHEMERAL RANGELAND	Actual Use			Licensed Use
	-Intensity	By allotment	As needed	
	-Frequency	Annually	As needed	As needed
	Utilization	No minimum standards		
	Weather	NOAA	NOAA	NOAA
	Trend			
	-Methods	Locally determined		Apparent
	-Intensity	1/pasture	1/pasture	
	-Frequency	10 years	10 years	10 years
		(+ Apparent trend every 5 years).		
	Condition			
	-Methods	ESI	ESI	ESI
	-Frequency	Planning or evaluation cycle		

[1/] Note: These represent minimum standards. It is expected that higher priority I allotments will require more intensive and more frequent monitoring.

Table 1. Proposed BLM minimum monitoring levels.

the monitoring process. However, field and staff personnel have identified the need for: 1) further refinement of some issues; 2) expanded scope of coverage to include additional areas of interest or concern; 3) new Technical References for areas where current knowledge is limited or lacking; and 4) technical training to accompany the use of new and existing Technical References. Current deficiencies in these areas result in: 1) reduced effectiveness of the monitoring process if all attributes are not considered or considered adequately; 2) reduced Bureauwide consistency in the monitoring process; and 3) reduced effectiveness of the TRS if needed training does not accompany its use.

C. Alternatives

1. Add additional technical references to the Technical Reference Series and update existing Technical References to make them as functionable and usable as possible, with supplemental training where needed. Revise or add handbooks as needed.

2. No action: Leave the TRS in their present form and context.

D. Recommended Action and Implementation Schedule - Alternative 1 is the preferred alternative. Table 2 shows the recommended actions and a proposed schedule for completing them.

V. Issue 4 - There is currently some confusion regarding the concepts of key area and key species.

A. Introduction and Analysis - Key area and key species concepts were developed to simplify monitoring procedures for practical application. Some degree of confusion exists regarding these concepts. Examples follow.

The difference between key area and key management area is often not appreciated. Definitions for each, as given on page 41 of the AIE Technical Reference (TR 4400-7) are as follows:

> key area: a relatively small portion of a rangeland selected because of its location, use, or grazing value as an area on which to monitor the effects of grazing use. It is assumed that key areas, if properly selected, will reflect the effects of current grazing management over all or a part of a pasture, allotment, or other grazing unit.
>
> key management area: an area of land that influences or limits the management opportunities of the land surrounding it. Key management area may be synonymous with key area.

The difference between these two concepts is best illustrated by an example. In a given pasture two key areas are established, one in a riparian area and the other on adjacent uplands. Objectives for the pasture prescribe a certain level of utilization on key species within the riparian key area. Thus, because it limits the management opportunities the riparian key area is the key management area of the pasture. The upland key area will also be monitored, since another objective is to increase utilization on uplands. Although it is representative of other uplands in the pasture, the upland key area is not a key management area because it does not limit the management opportunities of the land surrounding it. Similar confusion exists relative to the key species concept. It is a commonly held belief that key species must be forage species. This is not the case. Although in many instances a key species will be a forage species, there are other cases where the key species may be a important nonforage species or a species important for reasons other than livestock forage (see key species definition in the AIE Technical Reference, TR 4400-7, page 41). For example, a key species may be an important riparian species or a species important for wildlife cover. It could even be a rare plant species when objectives set utilization levels for that species.

Another source of confusion revolves around the question of when it is appropriate to study only key species and when all species should be the focus of monitoring studies. There is insufficient guidance to assist the field in making these determinations.

B. Alternatives

1. No action. Continue current guidance as is.

2. Amend the Technical Reference Series to provide better explanations of the key area and key species concepts. Include examples on the use of key areas and key management

Recommended Action	Proposed Completion Date	Responsibility
1. Climate/Weather TR - draft out	EOY '87	WO & Utah SO
2. Statistics TR - draft out	EOY '87	DSC
3. Riparian TR - field review	EOY '87	DSC
4. Utilization TR (TR 4400-3) - Revise as follows:	EOY '88	DSC
a. Mulch mgmt. section for Mediterranean annuals		w/input from CA and others
b. Pros/Cons of utilization studies at seed shatter vs. end of grazing year		
c. Discuss spring grazing pct. util. vs pct. util. of total forage produced		With input from all states
d. Discuss differentiating util. - livestock vs big game vs rodents, etc.		
5. AIE TR (TR 4400-7) - Refine whole TR and specifically the following:	EOY '88	DSC
a. Add section on evaluation of photographs		
b. Add actions taken & narratives to Illus. #14 (p. 36)		
6. Planning for Monitoring TR (TR 4400-1)	EOY '88	DSC
a. Emphasize evaluation of study design to see if data collected will show if management objectives are being met.		
b. Improve discussion on the use of the entire Technical Reference Series.		
c. Emphasize the fact that TR 4400-7 needs to be reviewed at the time monitoring studies are planned.		
7. All TR's - expand introduction sections	EOY '88	DSC
8. Range Handbooks - Revise or add:	EOY '88	WO
a. Inventory section - Bureau concepts and philosophy, uses and values of ESI, RVR's, ecological status in management		
b. Range condition and measurement section		
c. Suitability section - what to consider, general discussion		
d. Categorization (M, I, C) section		
e. New Glossary of Terms (with SRM review)		
9. Technical Training		
How - a. Bureauwide training	ASAP	PTC
b. Local level training	As needed	WO/DSC/SO/DO
What - a. TR's - riparian, statistics, climate/weather		
b. Range - photography, computers, graphics, plant taxonomy		
c. Crosstraining - soils, hydrology		

Table 2. Technical References- Recommended Actions and Schedule

areas, emphasize the fact that key species need not be forage species, and discuss the pros and cons of studying all species, key species, or a combination of both.

C. Recommended Action - Alternative 2 is the preferred alternative.

VI. Issue 5 - Can thorough field notes alone be the basis for a decision?

A. Introduction - It has been suggested that field notes alone can be used in the absence of quantitative monitoring data to arrive at decisions. For the purposes of this discussion, field notes are considered to be "documented professional judgment." They differ from a diary in that the latter is something the range professional keeps with him/her. Field notes, on the other hand, though they may duplicate diary entries, are placed in an allotment file. They represent the situation at a given point in time as observed by the range professional. To be most useful they should be relatively thorough in content and can contain observations on apparent trend, utilization, livestock numbers and distribution, weather, soil moisture, and other attributes of a particular allotment.

B. Analysis - A distinction must be made between the types of decisions that might be implemented in the management of livestock grazing. For purposes of analysis three types of decisions can be recognized: 1) decisions that no change in management is necessary; 2) decisions to make a change in livestock management other than an adjustment in stocking rate; and 3) decisions to make an adjustment in stocking rate. The first type of decision does not require issuance of a grazing decision; the other two types do.

Information needs vary by type of decision and level of controversy. Field notes by themselves can be used as a basis for the first type of decision (no change). They can be used alone to support the second type of decision (changes other than adjustments in stocking rate), at least when the level of controversy is low. They can very seldom (if ever) be used alone as the basis for the third type of decision (adjustment in stocking rate). The reason for this is that decisions to adjust stocking rates require that the range manager know that an adjustment is necessary and what the magnitude of the adjustment should be. Field notes alone may certainly tell the manager an adjustment is necessary. They cannot, however, quantify the level of adjustment needed. To reach that conclusion (i.e., to determine the actual number of AUMs to increase or decrease) requires quantitative data.

C. Alternatives

1. Use field notes alone wherever possible to make necessary decisions. Do not collect monitoring data except where adjustments of stocking rates appear to be necessary.

2. Use field notes: 1) on lower priority (C and some M) allotments where no intensive monitoring studies are established to indicate when such studies may be necessary or to document that no change in management is required; and 2) on higher priority (I and M) allotments as a supplement to intensive monitoring studies. Collect monitoring data on higher priority allotments not merely to adjust stocking rates but to evaluate progress made toward meeting allotment objectives and to support decisions to make changes in grazing management. Discuss this in the Technical Reference Series.

D. Recommended Actions - Alternative 2 is the preferred alternative. Personnel should keep diaries and take thorough field notes. Field notes must be kept in allotment files and should state, as clearly and succinctly as possible, the individual's observations at a particular point in time. Such notes should not be the responsibility of only range conservationists. Observations of all other resource specialists pertaining to a particular allotment should be kept in that allotment's file, at least to the extent such observations are relevant to grazing management. Field notes can include comments on the operator's actions but should avoid any reference to his or.her personality.

On allotments where intensive monitoring studies have not been established, field notes should be used to indicate when intensive studies should be initiated or as documentation that no change in management is necessary. On allotments with established monitoring studies, field notes should be used to supplement and interpret quantitative data gathered through these studies. Both sources of information should be used to arrive at and support grazing decisions.

The importance of good field notes cannot be overstated. In addition to their usefulness as discussed above field notes are invaluable in presenting the government's case at grazing appeal hearings. Include this discussion and recommendations in the Technical Reference Series.

VII. Issue 6 - Managers do not currently have sufficient flexibility to determine the methodology to be used in conducting ecological site inventories and determining ecological status.

A. Introduction - Current Bureau policy requires the use of the ecological site inventory (ESI) method to determine the ecological status ("condition") of rangelands. The ESI method requires the measurement of air dry weights of plant species. To determine ecological status the resulting species composition on a given ecological site is compared to the potential species composition for that site as set forth in Soil Conservation Service site guides. The SCS site guides are also based on composition by weight.

Quantitative trend studies, on the other hand, are based either on the measurement of the cover of plant species (Daubenmire, step-point transect, and line intercept methods); the frequency of occurrence of plant species (pace frequency, quadrat frequency, and nested frequency methods); or a combination of cover, frequency, and density (community structure analysis method). Species composition as determined by any of these methods is not directly comparable to SCS site guides, which are usually based on composition by weight. The result is that trend study data cannot usually be used to update range condition information determined by previous ecological site inventories. This means that 1) range condition updates cannot be accomplished very frequently and 2) additional studies must be performed to produce those updates. Both money and time could be saved if the same data gathered on ecological sites through trend studies could be used to determine range condition (ecological status) on those sites.

There are additional advantages to collecting ESI data on the basis of plant cover. On woodland and riparian sites cover is often a better indicator of a species' importance in a community than annual production as determined by weight measurements or estimates. The same is true for sites on which shrubs play a significant role. Plant cover is a more important attribute than production for watershed concerns. Wildlife biologists are often more interested in cover than in production data when developing and implementing plans for wildlife species. Cover is an easier attribute to measure, and the methodologies to measure cover are more easily explained to both Bureau personnel and the public than is the double-sample weight estimate method (which involves the use of linear regressions) for measuring production.

B. Analysis - The ESI method as currently practiced by BLM and the Soil Conservation Service (SCS) is based on the concepts of Dyksterhuis (J. Range Manage. 2:104-115, 1949). Dyksterhuis' methods were based on species composition by cover. This was later changed by SCS to species composition by weight (see SCS National Range Handbook, 1976). The BLM, through SVIM and later ESI, continued the process of describing range (ecological) sites on the basis of species composition by weight.

The genesis of weight measurements relates directly to the need to determine stocking rates on given rangelands. Weight is directly related to annual production which can then be used to determine the number of grazing animals a particular portion of range can support. Since 1982 it has been the Bureau's policy not to set stocking rates based on one-time inventories. Rather, such stocking rates are to be determined through the use of monitoring data in conjunction with inventory information. Thus, the need to gather information on species composition by weight is no longer critical.

C. Alternatives

1. Continue the current policy on ESI, which requires the collection of data on species composition by weight. When trend studies indicate a possible change in condition class on particular allotments, conduct studies to gather additional data on species composition by weight and thereby update the condition information.

2. Investigate the possibility of modifying the Bureau's policy on ESI to allow field offices to describe ecological sites on the basis of either composition by weight or

cover or both. Further, evaluate the possibility of allowing field offices the flexibility to amend SCS site guides to describe potential vegetation on a composition by cover basis and to use cover data collected through trend studies to update ecological condition.

D. Recommended Action - Alternative 2 is preferred. The Washington Office should form a task group to investigate the possibility of amending the ESI procedures as discussed above.

VIII. Summary - A sound technical foundation is of paramount importance to the Bureau's range monitoring program. The Technical Reference Series has proven itself to be a valuable part of this foundation. As we have seen, however, there are improvements that can and should be made to this series, both in the form of new Technical References and additions or revisions to existing ones. The Analysis, Interpretation and Evaluation Technical Reference (TR 4400-7) is of particular importance because it offers guidance on how to make sense of the myriad kinds of data collected using the procedures found in the other Technical References and how to analyze and interpret such data to evaluate progress toward meeting objectives. Too often this is the last Technical Reference studied; it should, in fact, be the first. A thorough understanding of the AIE Technical Reference will help to ensure proper selection of study methods and adequate study design.

As discussed in Section II above, however, the AIE Technical Reference falls short in its treatment of the process used to make forage allocation decisions. Implementations of the above recommendations should remedy this problem.

Although the Technical Reference Series is excellent--and will be even better following issuance of the revisions and new Technical References recommended--it cannot by itself form an adequate technical foundation to the Bureau's range monitoring program. Equally important is the ability of the Bureau's professionals to design and carry out the monitoring studies described in the TR's. Technical training must be greatly stepped up to increase BLM's ability level.

A sound technical foundation to the Bureau's rangeland monitoring program also depends upon the timely collection of appropriate monitoring data to make and support sound management decisions. To ensure proper timing and intensity of monitoring studies and to foster consistency Bureauwide, minimum monitoring levels, keyed to allotment category, are recommended for Bureauwide implementation.

Key area and key species concepts are not universally understood. Improving the discussion in the Technical Reference Series should do much to alleviate this problem, but this is another area where adequate training needs to be employed.

The decision process requires the evaluation of all sources of information. Thorough field notes are one valuable source. They can be used as a supplement to quantitative monitoring data on high priority allotments or as a principal information source on low priority allotments. They can be used alone as the basis for certain types of decisions but not for decisions effecting adjustments in stocking rate. Such decisions must be supported by quantitative monitoring data and supplemented by field notes.

The possibility should be explored of giving more flexibility to field offices regarding the methodology used in conducting ecological site inventories. In particular, the use of cover data in lieu of or in conjunction with production (weight) data might be allowed. This could provide more useful information in riparian areas, in woodland areas, and in areas where shrubs are important components of ecosystems. It would also allow for more frequent assessments of ecological condition on allotments where cover data are being collected to evaluate trend. A task force should be formed to investigate this possibility.

FINAL REPORT OF THE WORK GROUP ON: HANDLING MONITORING DATA

Leon Pack
Work Group Chairman

I. Introduction - There are several reasons that this topic was chosen for consideration during this workshop. Program evaluations have surfaced several concerns regarding the Bureau's monitoring efforts. There is widespread evidence of a lack of coordination in monitoring and data sharing. There is also a problem of adequate data collection but inadequate analysis. These problems are partially the result of a variety of or lack of filing systems for data collected through monitoring.

Also, as the Bureau has matured in the world of computers, resource areas, districts, states, and the Bureau are developing automatic data processing (ADP) systems to schedule monitoring and to store and analyze the results of that monitoring. There is currently no mechanism for sharing these individual developments and as a result there is a lot of duplication of effort and loss of efficiency, time, and money.

These concerns have been addressed in the six issues discussed below.

II. Issue 1 - Organization of Monitoring Data and Files

A. Introduction - Evaluations have shown something that field people have been aware of for a long time. There is no standard system or arrangement for filing of monitoring data and a lack of coordination in monitoring and data sharing.

B. Analysis - These problems may not apply to your district or state but they apply to almost everyone else's. Many of the problems the Bureau is experiencing are the result of its structure and program orientation. Each specialist has a program area that he or she is responsible to manage/protect and since that is what they are paid to do, that is what they are going to do. Therefore we end up with program oriented monitoring and filing.

The name of the Bureau of Land Management is significant in that it specifies that we are land managers. There is one resource that we manage and that is land with its accompanying soil and vegetation complexes. It is called by various names such as rangeland, watershed, or wildlife habitat, but these are all names developed by programs and activities. Most of the Bureaus' monitoring efforts should be focused on that one resource and not on that resources value to various programs, activities, or uses. If that were the case we would have no coordination or sharing problems.

BLM Manual 1734 requires that monitoring efforts ". . . must be coordinated among the various resource programs within the BLM to ensure effective and efficient multiple-use management of the public lands." (BLM Manual 1734.06).

C. Alternatives - The alternatives or solutions to the problems we are experiencing are many but only two are presented here. The first is a short term solution. The second is a rather idealistic but far reaching one.

1. The filing system described in Appendix 1 provides for the common storage of all monitoring data related to a specific allotment or management unit. It provides for the identification of every study as a unique entity which would allow storage in shared files and would link efficiently with a geographic information system (GIS).

2. The discussion in Appendix 2 presents a change not only for monitoring and data storage but for the development of activity plans for all programs. Its application would eliminate the problems of multiple plans on the same piece of land with conflicting agendas and each with its own monitoring plan.

D. Recommended Actions -

1. Require the use of a Bureau standard filing system for the storage of monitoring data. Use the format described in appendix one as the basis for such a system.

2. Emphasize the requirements for coordinated monitoring specified in the BLM Manual 1734.

3. Insure that PAWP advices clearly state that coordinated monitoring is the number one priority of all renewable resources.

4. Consider implementing the management planning approach discussed in Appendix 2.

III. Issue 2 - Hardware Requirements

A. Introduction - As the Bureau has come into the modern world of computers it has been with hesitancy and reluctance. Acquisition of machines has been unnecessarily difficult and productivity increases have been foregone. However, the Bureau now owns an impressive variety of machines which may or may not talk to one another or run one anothers programs.

B. Analysis - The inefficiencies of owning a variety of machines is self evident. The Bureau needs to develop a standard for the machines they are to acquire. They must not, however, stifle the initiative of their employees.

The Bureau must also make the process for acquisition of ADP equipment more efficient so that the problems of acquisition does not persuade people that it is easier to do their work the old way.

C. Alternatives -

1. We can continue as is and lose the benefits that are available through ADP or,

2. We can increase the productivity and efficiency of resource specialists by allowing the easy acquisition of machines and encouraging their use.

D. Recommended Actions -

1. All hardware acquisitions must be IBM PC (MS-DOS) compatible.

2. Delegate approval authority for the acquisition of PCs and related hardware and software to the lowest possible level.

3. Remove the ceiling amount that states may spend for ADP purchases without Washington Office approval.

4. Do not limit the use of computers to "computer specialists" and data entry personnel.

5. Locate computers in the resource specialist's work area. They should not be placed in central locations or where access is limited.

IV. Issue 3 - Software

A. Introduction - This is not a well worn chamois or Pendleton shirt. It is the thing that makes the computer go. Software development is occurring at a phenomenal rate with packages ranging from "space invaders" to data base managers.

B. Analysis - There are both advantages and disadvantages associated with the acquisition and use of a variety of software packages. Each software package has features which can be exploited in particular applications and may reap significant benefits to the user. These benefits must be weighed against the costs associated with support and maintenance of the variety and the costs and time spent in converting from one package to another.

The Bureau must develop packages for storage and analysis of monitoring data. With the advent of the PC in the resource area, the opportunity exists for great capability and flexibility in the storage and analysis of data.

C. Alternatives - None

D. Recommended Actions -

1. Training of resource specialists in the capabilities and use of current Bureau standard software packages should be strongly promoted as computers become available in the resource area.

2. Allow exceptions to Bureau software standards to allow the field to take advantage of packages which provide new or enhanced capabilities and efficiencies.

3. Establish an evaluation program for new software developments to measure their particular application to resource management and to disseminate the results of these evaluations to the field. Such evaluations

must involve individuals with field experience who understand the tasks to be managed.

4. Approve software packages which provide significant advantages and applications to the field as Bureau standards.

5. We also recommend that the Bureau develop storage and analysis software packages for commonly used monitoring techniques. Include graphics capability in the programs that are developed.

V. Issue 4 - New Technology

A. Introduction - ADP applications in handling monitoring data are significant and the Bureau can no longer ignore them. The tremendous monitoring workload of some resource areas makes traditional methods of recording, storing and analyzing monitoring data inadequate.

B. Analysis - The time has come where electronic notebooks are not only feasible, but are almost essential if the field is to meet it's monitoring commitment. One such device that was demonstrated for the work group by Omnidata International, Inc. was the Polycorder Series 600 portable data collector. It can be programmed to record, store, and transmit data to a desk top personal computer (PC) for compilation and analysis. One of its most impressive features was the bar code scanner. With the use of bar codes (see Appendix 3 and the optical scanner it is possible to record standardized error free data without the cost of key entry and transcription. It is our opinion that the cost of this product would be offset by time savings within one year.

C. Alternatives - None

D. Recommended Actions -

1. We recommend that DSC evaluate the effectiveness of the Polycorder 600 or similar device.

2. We recommend that the Service Center provides support for this technology.

3. We recommend the immediate acquisition and application of this technology.

VI. Issue 5 - Information Sharing

A. Introduction - Personal computers are finally being placed in Resource Areas where they can be used to enhance our capability to perform on-the-ground resource management. Many good computer program ideas are being developed by specialists in the field but no formal mechanism exists to exchange ideas, needs or existing programs. It is essential that a means for sharing information be established.

B. Analysis - Unless we devise some simple mechanism for sharing computer programs developed in field offices, we will continue to spend unnecessary workmonths and dollars reinventing the same idea. It is essential that a newsletter, in some form, be established in which which the field staff can describe programs they have developed or that they need. This must not include any review or clearinghouse function but must encourage a free exchange of ideas. No attempt should be made to control input to this newsletter because this would discourage sharing of locally developed ideas.

C. Alternatives -

1. DSC Resources Staff serves as the focal point for receiving, collating and disseminating information in either a printed newsletter or on a system like electronic mail.

2. DSC establishes an electronic bulletin board on which anyone can post messages.

D. Recommended Actions -

1. We recommend that DSC establish and maintain an electronic monitoring information system, that can be used by all field offices. Items which could be included in such a system include: a newsletter, bulletin board, software applications catalogue, etc.

2. A member of the DSC Resources staff should be designated to manage the Electronic Monitoring Information System.

3. We also recommend the formation of a Monitoring ADP work group to promote ADP information sharing and application in monitoring.

VII. Issue 6 - Geographic Information Systems (GIS)

A. Introduction - We recognize the potential of the GIS to assist in the analysis, geographic display, and linking of monitoring data to other automated data bases.

B. Analysis - The complexity of the rangeland monitoring program limits GIS to localized applications. The use of GIS should be used as needed for local analysis and should not be a general requirement for use by every office. The capture of GIS spatial data is expensive and time consuming. However, as the Bureau refines it's procedures and means of analyzing data, the GIS may provide a cost effective means of completing complex study analyses.

The Bureau has vast quantities of resource related data (JDR's, IHICS, ESI, etc.) residing on the DPS 870 and level six systems. The linking of these systems with the GIS Data General for the purpose of analyzing data from both systems is available and should be pursued.

Also, the emerging Land Information System (LIS) has significant potential for use in monitoring Bureau management actions.

C. Alternatives - None

D. Recommended Actions -

1. Continue to maintain coordination and communication with the GIS.

2. Refine computer graphics capability for monitoring application.

VIII. Summary

A. A format for storage of allotment information has been proposed as a Bureau standard. It should result in more efficient access to data by all specialists, lower costs in monitoring efforts, and more accurate management decisions. A proposal to change not only the monitoring processes but the activity planning process as well was presented to promote coordinated resource management and to avoid program bias and duplication of monitoring and management efforts.

B. It was recommended that approval of acquisition for PCs be delegated to the lowest possible level and that in the future all PCs must be IBM (MS-DOS) compatible. It was also recommended that use of the computer by field personnel be encouraged.

C. Training should be provided to resource specialists regarding the capabilities of the various software packages available. There should be an evaluation process for new software developments with reviews and results provided to the field.

D. The use of electronic notebooks for data collection was recommended.

E. The creation of an electronic monitoring information system and a monitoring ADP work group was recommended to facilitate the exchange of ADP application information.

F. The use of GIS should be left to area discretion but can serve as a valuable analysis tool.

Appendix 1

This appendix describes a filing system for the storage of allotment information.

Contents

1. Allotment Files

2. File Organization

2.1 Allotment Information

  2.11 Activity Plans

  2.12 Allotment Maps

  2.13 Historical Information

  2.14 Environmental Assessments

  2.15 Monitoring Plans

2.2 Allotment Supervision

2.3 Studies

  2.31 Actual Use Studies

  2.32 Utilization Studies

  2.33 Trend Studies

  2.34 Photographs

  2.35 Climate Studies

  2.36 Supplementary Studies

2.4 Allotment Evaluation

Illustrations

1. Compartment Filing

2. File Section Filing

3. Study Files

4. Study Numbering

5. Studies Index System

1. Allotment/Management Unit Files

The use of the word allotment may also imply management unit. These files are to be developed for all allotments which are being monitored and may be developed for all allotments. There are distinct advantages to be gained by having separate files for all allotments since supervision and evaluation of all allotments is required.

Allotment files are to contain allotment specific information which is not normally included in grazing administration case files. Information or items which should be in these files are activity plans, range improvement information, historical and background information, study information, photographs and evaluation documents.

Allotment files are to be stored in one location in the resource area which is readily accessible to all specialists. These records are not to be kept in private or activity based filing systems.

2. File Organization

Files are to be divided into the four sections described below. They may be organized in compartment type folders, in sections of files as shown in illustrations one and two respectively or a combination of these methods. File folder sizes should comply with Bureau standards.

2.1 Compartment/Section 1: (Allotment Information) This section is to include information dealing with allotment management, objectives, and background information. Items to be included, if they exist, are:

2.11 Activity Plans: Allotment management plans, allotment development plans, coordinated resource management plans, operations plans, etc.

2.12 Allotment Maps: If there are maps which are too large to be filed here a reference as to their location must be filed here.

2.13 Historical Information: Allotment histories and information which would be helpful in allotment management, understanding, and evaluation.

2.14 Environmental Assessments: Assessment which examined the consequences of activity plan development. Not EA's relating to individual range improvement developments.

2.15 Monitoring Plans: Allotment specific monitoring plans and schedules (including data interpretation and plan evaluation) for the allotment.

2.2 Compartment/Section 2 (Supervision): This section contains information regarding supervision of the allotment, such as allotment inspection reports, allotment visit records, etc.

2.3 Compartment/Section 3 (Studies): This section includes study related information which is relevant to the management of or accomplishment of allotment objectives. Studies are to be filed individually and arranged in chronological order from the date of establishment, see illustration 3.

Studies are to be numbered (as shown below, also illustration 4) with numbers which consist of the legal location of the study and such other identifiers as necessary. This method of numbering is easily used with GIS, pinpoints the location of the study to a 2 1/2 acre tract, and provides a unique number for filing and indexing. Latitude and longitude may be substituted but the entire resource area must use the same system.

Study Number:	Meridian	TWP	Range	Section	1/4	1/4	1/4	1/4	Additional
	20	/0140N/	0470E/	034/	A /	B /	C /	D /	_____

Illustration 5 describes a studies index system which is currently in use in several resource areas in Montana.

2.31 Actual Use Studies: This section includes actual use data for the allotment regardless of the source of the information or the animal species making the use. Types of information which would be included in this section are (a) reports submitted by the range user, (b) animal count reports (livestock, wildlife, wildhorse and burros) and (c) summary information.

2.32 Utilization Studies: This section should contain utilization information and should also include study location and methodology descriptions. Items which must be included are: 1. summary information, 2. use maps or reference to their location, 3. notes regarding unusual occurrences (high level of insect utilization), 4. key species identification, etc.

2.33 Trend Studies: Study location and methodology information must be included in this section along with data summaries, both tabular and graphic as appropriate.

2.34 Photographs: Are to be filed with the appropriate study type. They will have the same study number as their associated study. These are not miscellaneous general view photographs.

a. Identification: The study number and other identification information must be in the picture or written on the photograph.

b. Filing: Photos should be filed in a protective envelope with the study number visible on the face of the photo.

c. Negatives: Negatives should be filed in the envelope with the photographs. If negatives are filed in a separate location, their location must be noted with the photograph.

2.35 Climate Studies: All climate data regardless of source should be included. Information which should be included (if collected) is:

a. Precipitation and Temperature Data
b. Soil Moisture and Temperature Data
c. Range User Climate Reports
d. Reports of unusual or exceptional weather events such as: hail, heavy rain, exceptionally dry or wet periods, unusual frosts, etc.

2.36 Supplementary Studies: This section should include all studies or information which is not included above but which is useful or needed for allotment evaluation. Such information might include:

a. Occurrence of unusual or exceptional events such as fire or high levels of insects.
b. Dietary Studies
c. Productivity studies such as stock or waning weights, doe/fawn counts, etc.

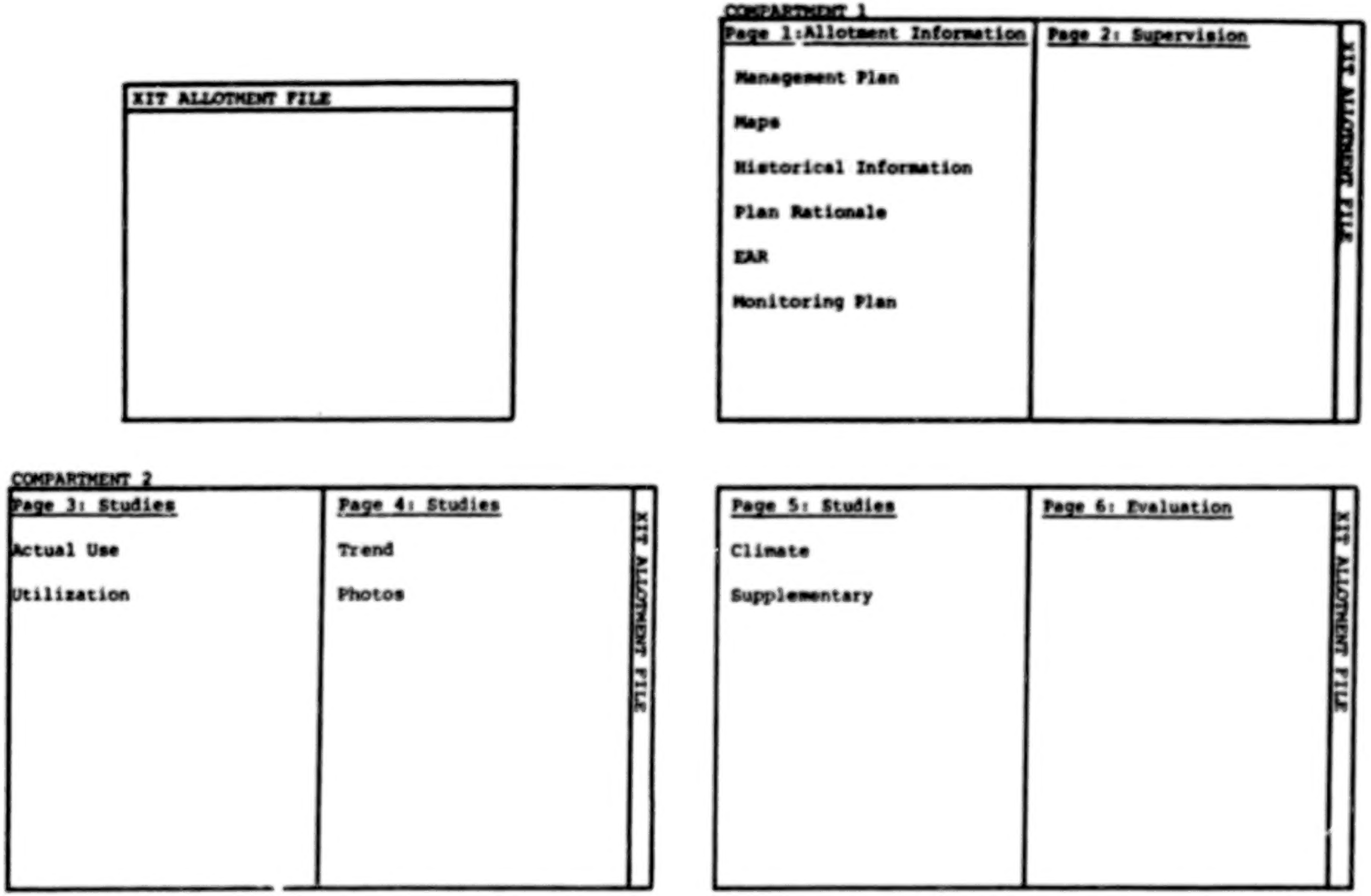
d. Recreation use as it relates to allotment management

e. Wildhorse and burro information.

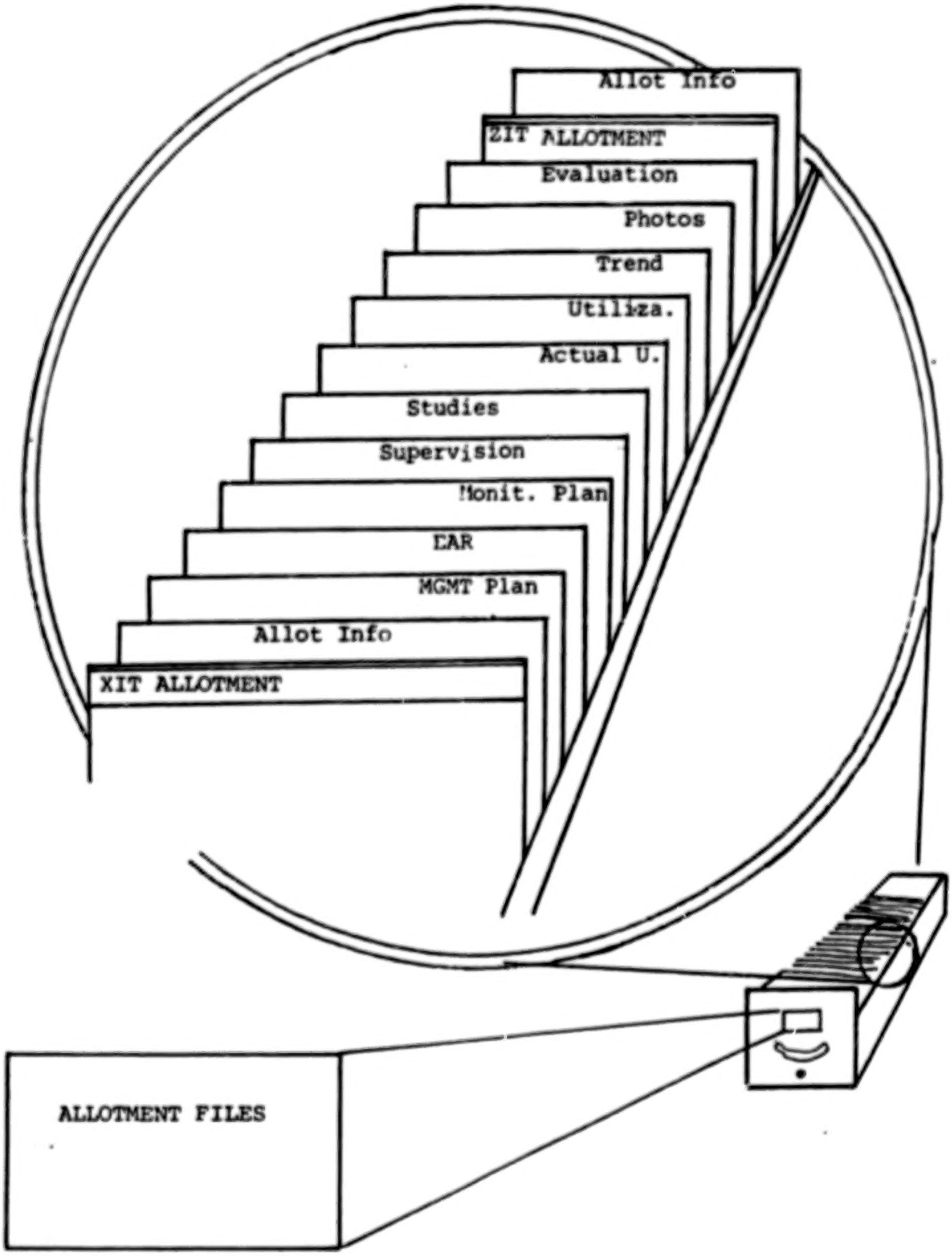
f. Incidental photographs. These should include location and descriptive information and could be numbered in the same manner as studies.

2.4 Compartment/Section 4 (Evaluation): This section would include the annual allotment assessment and the allotment evaluation. It would also include summary information needed to support the recommendations which resulted from the evaluation.

Appendix 1 - Illustration 1

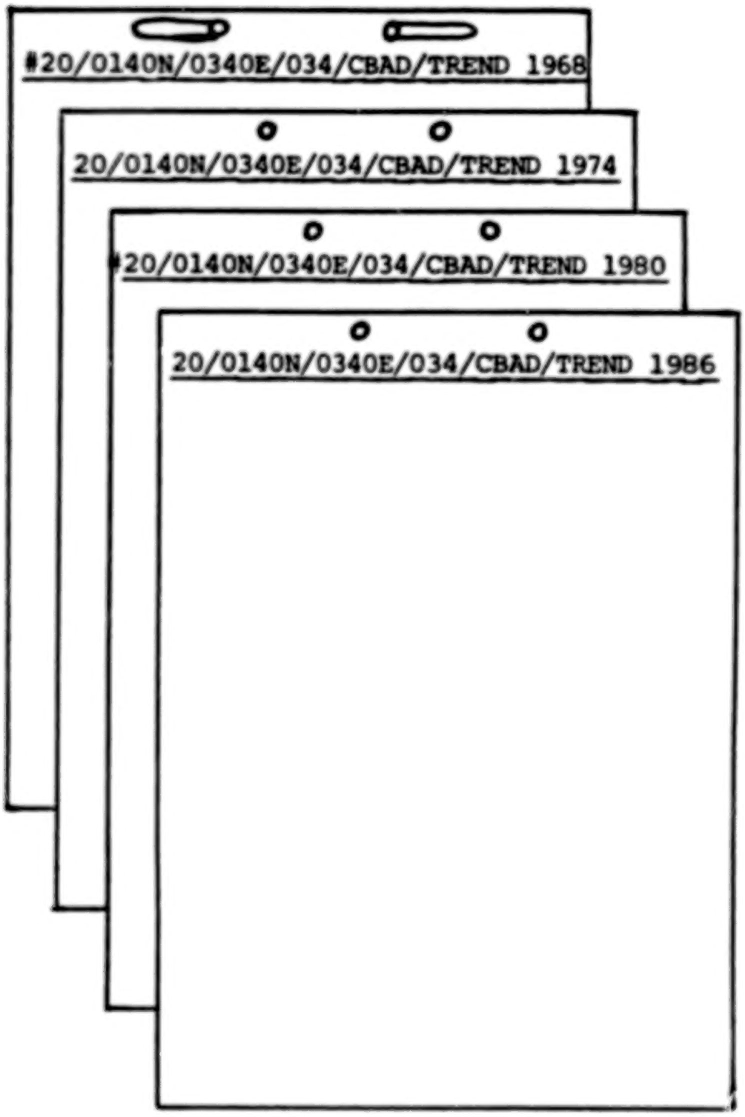


Sketch of a section of an allotment file drawer. Seperate files could be developed for each category or information could be aggregated as appropriate.



Appendix 1 - Illustration 3

Study Filing: Studies will be filed as individuals and in chronological order as shown below.


#20/0140N/0340E/034/CBAD/TREND 1968
20/0140N/0340E/034/CBAD/TREND 1974
#20/0140N/0340E/034/CBAD/TREND 1980
20/0140N/0340E/034/CBAD/TREND 1986

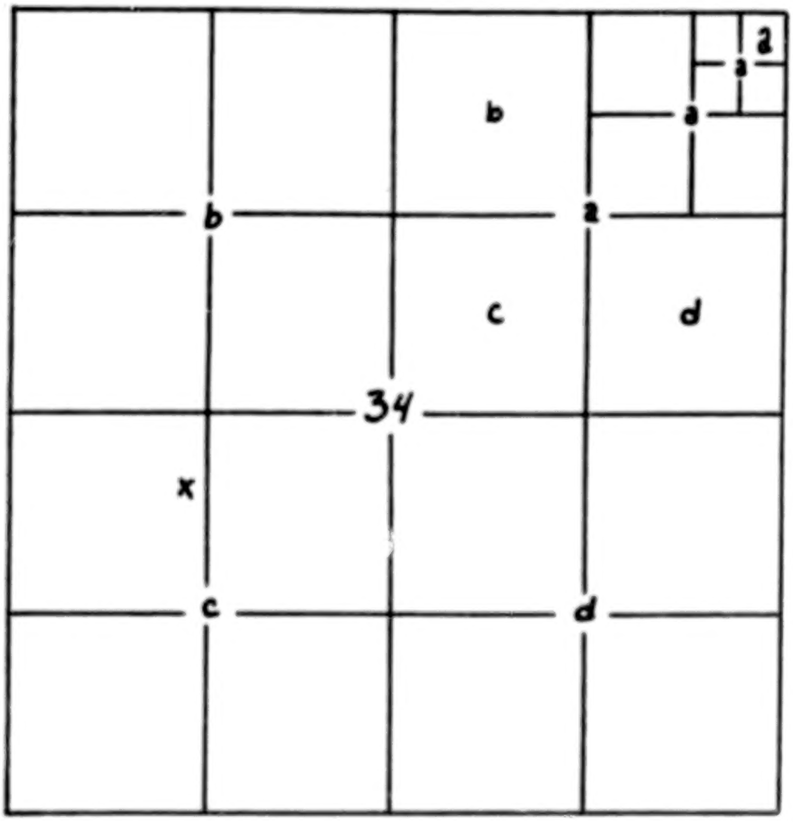
Appendix 1 - Illustration 4

Study Numbering: All study numbers would include the legal location of the study and such other identifiers as necessary. A study at the loca- shown in figure one would have the following number:

1/ 2/ 3/ 4/ 5/ 6/
2 0 / 0 1 4 0 N / 0 3 4 0 E / 0 3 4 / D A B C/ _ _ _ _ _

1/ Meridian
2/ Township; from the bureau data element dictionary
3/ Range; from the bureau data element dictionary
4/ Section
5/ Aliquot part; a = NE, b = NW, c = SW, d = SE
6/ Other identifiers as necessary

Figure 1: A study located in section 34 of township 14 north, range 34 east, Montana principal meridian.



Studies Indexing: The studies index system described here is being used successfully in several reaource areas in Montana. It is currently developed using Aspen but could easily be developed using other software packages. Some modifications would be necessary for application with the proposed study numbering system. Additional data elements could by added by resource areas to meet their individual needs.

United States Department of the Interior
Bureau of Land Management

STUDIES INDEX SYSTEM
(Data Input Form)

(1) Study Number				(2) Agency	(3) Resp.	(4) Type	(5) Purpose	(6) Veg.	(7) Year Init	(8) Data Base Year	(9) Freq	(10) Time	(11) Allot Number	(12) Resource Area	(13) Mgt Cat	(14) Status	(15) Remarks
Twn	Rng	Sec	Series No														

MT-4400-1 (August 1984)

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LEGEND FOR CODING

1. Study Number

01N	04W	33	01
Twn.	Rng.	Sec.	Series No.

2. Initiating Agency

B = BLM
F = USFS
S = SCS
W = USFWS
U = University
G = State Fish/Game
O = Other

3. Responsible Discipline

R = Range
W = Wildlife
H = Hydrology/Soils
F = Forestry
O = Other

4. Type Study

G = General view photo stations
P = Photo plot, close-up
T = 3 x 3 photo plots with data
M = Stereogram
B = Cover (vegetation profile) board
I = Low elevation aerial photography
R = Riparian
E = Exclosure
F = Forest regeneration
S = Soils related studies
H = Hydrologic studies
D = Daubenmire canopy coverage transects
V = SVIM transect with photo plot
L = Other line type transects
O = Other

5. Purpose of Study

T = Trend
U = Utilization
W = Weather
D = Demonstration/research
C = Comparison sites

6. Vegetation Type

G = Grasslands
S = Shrublands
T = Tree types
W = Wetlands (riparian)
B = Burn sites
L = Logged sites

7. Year Initiated — This is the year the study was actually installed on the ground.

8. Data Base Year — The year from which frequency samples should be figured (when the grazing system became operational).

9. Frequency of Samples — How often to sample or the number of years between study maintenance.

This is always a whole number (i.e. 1,2,4, etc.). Studies maintained multiple times during the same year are simply entered as another study, with:

— Frequency of Samples indicated with a "1," and
— Time Span indicated with appropriate multiple sample periods (see example under Time Span).

10. Time Span — The time during the year to maintain the study.

A
B
__ __ — __ __
Month Month (optional)

A = 1st half
B = 2nd half
— = multimonth

(Examples)
04A = April 1-15
10B = October 15-31
01-12 = January - December(yearlong)
Multiple water quality studies (Jan. 5, June 20, and Sept. 19)
— enter one study in Jan. using **01A** in Time Span.
— enter one study in June using **06B** in Time Span.
— enter one study in Sept. using **09B** in Time Span.

You need only fill in all items on the *first study entered* for Jan. (01A). Then simply enter 06B and 09B immediately below to indicate all other study items are identical except for the time.

11. Allotment Number — 4 digit RMAS number

12. Resource Area

0248	Big Dry	0668	Havre
0278	Powder River	0678	Billings
0288	SDRA	0688	Judith
0348	West R.	0748	Garnet
0358	East R.	0758	Headwaters
0648	Valley	0768	Dillon
0658	Phillips		

13. Management Category

M = Maintenance I = Improvement C = Custodial

14. Status of Study

A = Abandoned C = Current P = Proposed

15. Remarks — 20 spaces are available for optional local use.

Appendix 2

This appendix describes a change in activity planning and monitoring procedures.

CONTENTS

I. Handling Monitoring Data

  A. Grazing Case Files

  B. Allotment Files

  C. Management Unit Files

    1. Management Unit Plan

    2. Management Unit Objectives

    3. Monitoring Plan

    4. Study Index

    5. Studies

Illustrations

  1. Files

  2. Study Index

Integrated Activity Planning and Monitoring System

The Handling Monitoring Data work group was requested to review the existing problems of actually filing, keeping and displaying data related to Rangeland Monitoring. During our initial work group session it became rather obvious to us that the inherent "problems" we were trying to deal with in regard to handling monitoring data were actually symptoms of a larger problem; lack of what we would term "Integrated Activity Planning and Monitoring."

This is not a new concept. The idea has been around for years. It has been used in several areas of the Bureau. The idea is to write integrated, interdisciplinary activity plans on a management unit basis, formulating various objectives which each activity attempts to achieve. This eliminates the need for activity-specific activity plans (AMPs, HMPs). Monitoring would be conducted on a management unit basis utilizing existing studies for establishing baselines and setting objectives.

Handling data would be simplified. Data would be collected, filed, displayed, etc. on a management unit basis, eliminating the "possessory" concept of filing study information by activity which appears to be so prevalent today.

It is not our intention to fully describe how "Integrated Activity Planning" would evolve, but to describe our concept of how monitoring data could be handled within this type of system.

A. Grazing Case Files - It is anticipated that larger management units would be made up of groups of allotments. Administration of grazing would continue on an allotment-permittee basis. This would necessitate the keeping of separate grazing case files as occurs now.

B. Allotment Files - Each allotment would continue to have a separate allotment file if necessary, as occurs now. Allotment files would contain allotment-specific information needed for management and administration of that particular allotment.

C. Management Unit Files - Each management unit would have its own set of files created (see Illustration 1). Each management unit file would consist of the following:

1. Management Unit Plan - basically a copy or a summary of the interdisciplinary plan, evolved from land use planning, for that particular management unit.

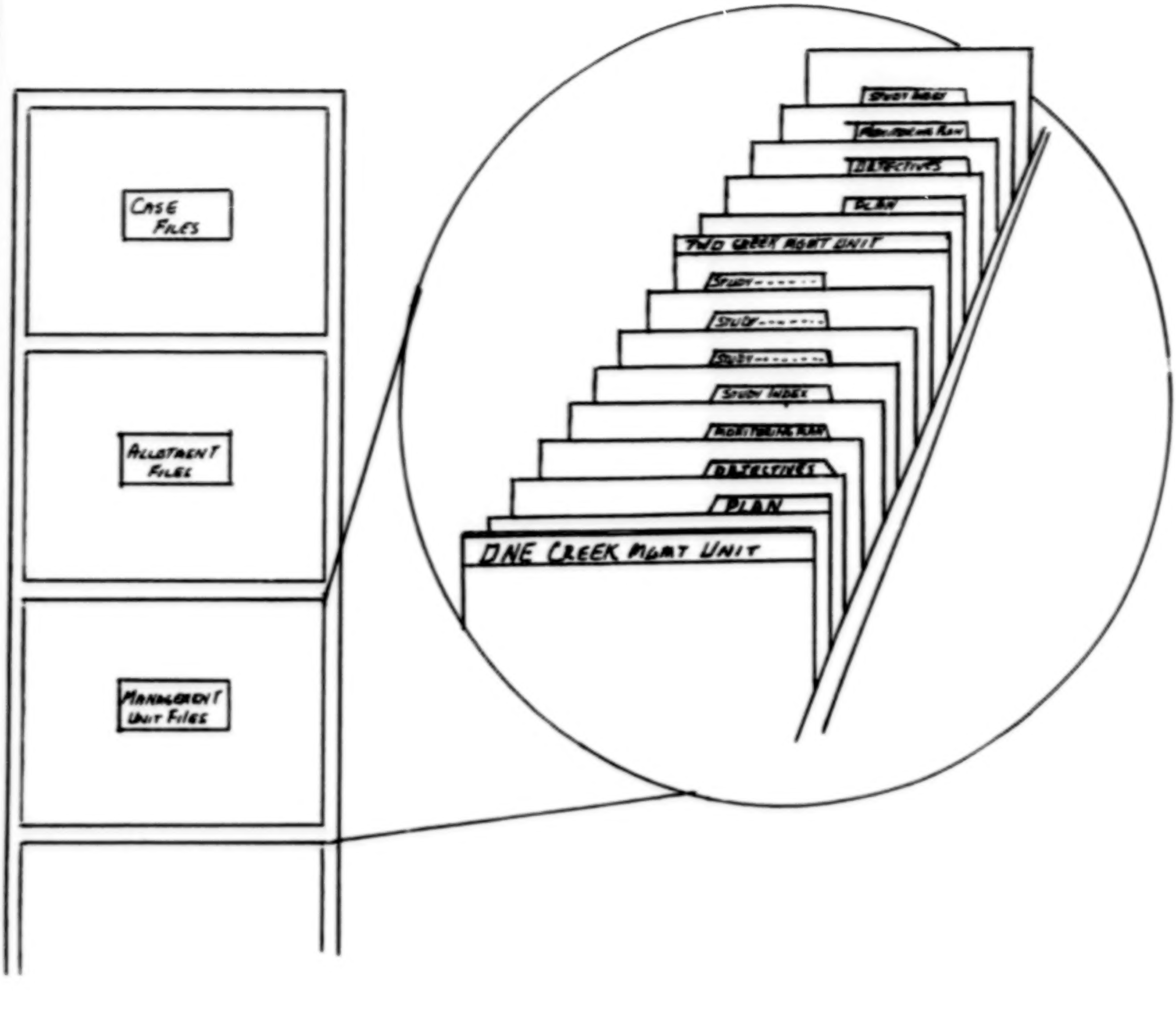
2. Management Unit Objectives - a copy or succinct summary of the management objectives for that particular unit. All objectives for the unit should be quantifiable and monitorable. Objectives would include those for any and all activities involved in the management of that particular unit, whether they are range, forestry, wildlife, watershed, etc. related.

3. Monitoring Plan - plan of action for monitoring progress toward achieving the Management Unit Objectives. The plan would include type of studies used, schedules for reading, schedules for evaluation, etc.

4. Study Index - a tabular summary of all studies within the Management Unit. (see Illustration 2).

5. Individual Studies - each study within the Management Unit filed separately within the Management Unit File. Each study would receive its own unique number and be included in the Study Index. All information pertaining to that study (photos, data sheets, etc.) would be filed with that particular study.

Appendix 2 - Illustration 1



United States Department of the Interior
Bureau of Land Management

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(Data Input Form)

(1) Study Number				(2) Agency	(3) Resp	(4) Type	(5) Purpose	(6) Veg	(7) Year Init.	(8) Data Base Year	(9) Freq	(10) Time	(11) Allot. Number	(12) Resource Area	(13) Mgt. Cat.	(14) Status	(15) Remarks
Twn	Rng	Sec	Series No														

MT-4400-1 (August 1984)

LEGEND FOR CODING

1 Study Number

01N	04W	33	01
Twn.	Rng.	Sec.	Series No

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A
B
__ __ – __ __
Month Month (optional)

A = 1st half
B = 2nd half
– = multimonth

(Examples)
04A = April 1-15
10B = October 15-31
01-12 = January - December(yearlong)
Multiple water quality studies (Jan. 5, June 20, and Sept. 19)
— enter one study in Jan. using **01A** in Time Span.
— enter one study in June using **06B** in Time Span.
— enter one study in Sept. using **09B** in Time Span.

You need only fill in all items on the *first study entered* for Jan. (01A). Then simply enter 06B and 09B immediately below to indicate all other study items are identical except for the time.

11 Allotment Number — 4 digit RMAS number

12 Resource Area

0248	Big Dry	0668	Havre
0278	Powder River	0678	Billings
0288	SDRA	0688	Judith
0348	West R.	0748	Garnet
0358	East R.	0758	Headwaters
0648	Valley	0768	Dillon
0658	Phillips		

13 Management Category

M = Maintenance
I = Improvement
C = Custodial

14 Status of Study

A = Abandoned
C = Current
P = Proposed

15 Remarks — 20 spaces are available for optional local use.

These bar codes represent the scientific name of the species listed. Using sheets like these and the bar code scanner data could be recorded on the Polycorder 600 and preliminary analysis completed to assure statistical adequacy while in the field. The data could then be loaded to a desktop computer in the office for further analysis and report preparation without further data entry or editing.

INDIAN RICE GRASS

BLUE BUNCH WHEAT GRASS

PRARIE JUNE GRASS

BIG SAGE BRUSH

FOURWING SALT BRUSH

BLUE GRAMA

BOTTLE BRUSH SQUIRL TAIL

SANDURGS BLUE GRASS

GLOBE MALLOW

SERVICE BERRY

A portable data collector designed with the user in mind...

Applications include:

- agricultural research
- forest and timber management
- natural resources inventory
- agronomy research
- biological research
- meter reading for water, electric, and gas utilities
- factory data collection for inventory, quality assurance, maintenance, etc.

New features include up to 256Kb of memory, a 4 line display, smaller and lighter size, and a base price under $2,000.

The Polycorder is a:

- **Data Entry Terminal:**
  information can be manually entered on the alpha-numeric keyboard
- **Data Logger:**
  digital sensors and instruments such as barcode wands can be attached directly to the Polycorder which reads and stores the sensor output
- **Portable Hand-held Computer:**
  the Polycorder can be programmed to transform, summarize, and analyze data

Polycorder Benefits:

- **Constructed for Field Use**
  The Polycorder was designed to operate in adverse conditions. It is waterproof and dustproof with a break resistant case. The keys are large enough to allow the user to wear gloves while entering data.
- **Long Term Battery Operation**
  60 hours of continuous operation from 6 "AA" nickel cadmium rechargeable batteries. A backup battery protects data and programs for up to 5 years.
- **Portable, Lightweight Design**
  Small enough to fit inside a vest pocket. Size: 8" x 4" x 2". Weight: 1 lb. 13 oz.
- **Programming Flexibility**
  Through programming, you can make the Polycorder act on the data it records. Mathematical calculations and validity checks can be performed as data is entered. The user can be warned if data is invalid or not within range.
- **Immediate Data Retrieval and Analysis**
  Data can be transferred directly to a computer, printer, or modem via the RS-232-C communications port. Reports can be generated and data analyzed without delay.
- **Time and Money Savings**
  Manual data reduction and keypunching are eliminated, saving time and money.
- **Options**
  — expanded alpha keyboard
  — sensors including barcode wands and electronic calipers
  — download modules for uploading and downloading programs and data

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FINAL REPORT OF THE WORK GROUP ON:
INFORMATION AND EDUCATION

Tony Danna
Work Group Chairman

I. Introduction - Monitoring training and information distribution has been a on-going process in the Bureau for many years. This process of informing field personnel of changing technology and Bureau acceptable practices has changed several times in the past four decades. The Bureau Manual, Technical Bulletins, Handbooks, Information Bulletins, Technical References, and Training Sessions have been the mainstay of Bureau monitoring guidance.

This work group's task is to review and evaluate the guidance available, both Bureau and non-Bureau, and make recommendations on improving the materials available and methods of distributing this material to employees.

The work group reviewed training videos, PTC training packages available for range, types of computer options available, information distribution approaches. Needs were identified and the following recommendations were developed.

II. Issue 1 - Current Training Review

A. Introduction - Currently, there is no specific Bureauwide monitoring course. There are some courses being developed and training which contains the monitoring subject as an agenda item. Each state has some monitoring training or currency at the area or district office level. Public involvement has been somewhat limited up to this point.

B. Analysis -

1. Phoenix Training Center

a. Beginning Professional Training Course - currently, there has been five days of monitoring training given. In FY 87, this training will be reduced to one and half days.

b. Allotment Management Plan Course - monitoring in relation to specific objectives has been discussed. Specific monitoring plans are included in some AMPs.

c. Vegetation Attributes Video Presentation - Originally, produced at PTC but now available from each state office.

d. Other Courses Being Developed - Ecological Site Inventory, monitoring data interpretation, case studies, and evaluation courses are in various stages of development for decentralized training, are being developed by PTC.

2. Individual States' Training (see chart at end of section). Each state had various degrees of within state training and the content varied widely. A summation of the types of training offered are listed below:

a. Monitoring Training or Workshops: a actual training session with instructors or guest speakers were mentioned by most states. This training or workshop has usually been conducted in one location within the past four years.

b. Analysis, Interpretation, Evaluation Training or Workshops: Arizona, Nevada, Oregon, and Wyoming appear to be the only states actively conducting this material, with many states planning one.

c. General Program Coordination Sessions (including monitoring): most states mentioned yearly or every other year program coordination meetings with new monitoring policy or guidance issued.

d. Ecological Site Inventory Training or Workshop: only three state mentioned specific Ecological Site Inventory Workshops. The relationship with monitoring was discussed at both.

e. Pre-season Monitoring Calibration Meeting: this training at the local resource area level was common in all states. Certain resource areas were involved more than others, but most had at least a short session to discuss techniques for field employees.

3. Outside the agency training: Most states mentioned some monitoring coordination with universities, agricultural extension service, Forest Service, and Soil Conservation Service. Some coordination with the Society of Range Management was also mentioned.

C. Recommended Actions/Implementation - WO will issue instruction memo to State Directors to:

1. The coordination, training, and workshops presented by each state should be continued and expanded to provide full coverage to monitoring personnel. Monitoring coordination done annually beginning in FY 87.

2. Training should be available as refresher courses to increase proficiency.

3. States should take advantage of other states training and consider incorporating the annual refresher process.

4. Emphasis should be placed on training at the resource area level to multiple resources specialist, not just the range staff.

5. States will send an annual training and workshops schedule to PTC for consolidation on a continual basis beginning in FY 87.

III. Issue 2 - New Training Needs - After reviewing and comparing the existing monitoring and management training available in the Bureau, this task group suggests the following new or expanded courses be developed:

A. Use of Ecological Site Concepts in Management.

B. Data Collection Methods and Technical Proficiency

C. Analysis, Interpretation, and Evaluation of Monitoring Data.

D. Public Participation, Cooperation, Consultation, and Coordination Methods.

Each of these suggested courses will be discussed separately:

ECOLOGICAL SITE CONCEPTS IN MANAGEMENT

A. Introduction - The Bureau is using and committed to the ecological site concept. However, the level of education and workable knowledge of the ecological site concept is lacking.

B. Analysis and Alternatives - Develop a training course: such as "Ecological Site Concepts in Management." The main topics which should be taught in modules as follows:

1. Policy, Regulations, Laws, Relation to Ecological Site Concept

2. Technical Procedures in applying Ecological Site Concept

3. RISC - Range Inventory Standardization Committee.

4. Standardization of data, how much data, key area concept, development of objectives, and variations from standards.

5. MIC monitoring needs - priority and intensity of monitoring. How much data is needed.

6. Consistency in data collection, evaluation, interpretation and analysis.

7. A thorough understanding of ESI and the SCS National Range Handbook.

8. Communication of these concepts to user groups.

C. Recommended Actions - W.O. should direct PTC to develop and implement a training course on ecological site concepts and how they are used in management with the topics previously discussed. The training course should be developed in segments as to facilitate the option of teaching only portions of the course to different target groups or the entire course depending upon need and/or level of competency of target group.

Draft Basic Outline of Course:

I. Policy, Regulations, Laws, Relationship to the Ecological Site Concept.

A. Short video from director on importance.
B. How all the policies etc. fit in and correlated.
C. How to use policies etc.

II. Technical Procedures.

A. May want a short video showing field work.
B. Workbooks and presentation on each procedure which are acceptable.
C. Field practice group sessions.

III. RISC. - Good discussion and information sessions.

IV. Standardization of data, how much, key area objectives, variations.

A. Importance of standardization and how to get it.
B. What data, how much to support what you want to evaluate.
C. Key area concept in relation to objectives; what are they; and how to use them.
D. Other methods or variations to standards; what to do.

V. MIC Monitoring Needs - Priority & Intensity.

A. Objectives for MIC Allotments.
B. What do you want to do, priority.
C. Budget, time, and level of information needed.
D. What is needed when, how, and what for.
E. Related to laws, policies, etc.

VI. Consistency in data collection, evaluation, interpretation and analysis.

A. Purpose and importance.
B. Examples, good-bad results.
C. How to obtain consistency in local procedures.
D. In local decision making.

VII. ESI Understanding.

A. What is ESI and its relationship to the Ecological Site Concept.
B. Importance and what it can do for management.

VIII. Communication to User Group.

All segments can be produced in a variety of ways and methods and should be interrelated.

D. Implementation -

1. The training should be developed by PTC with help from W.O., DSC, field office participation, and advice from Range/Soil Team with a multiple use concept built into the training.

2. Should be able to be used in segments for specific target groups or as a complete course/or self-study course.

3. State Office should be responsible for overseeing the training using field office people to help as instructors.

4. Everyone in management should have at least part of the training course with field people in range, wildlife, and soil, air, and water, taking entire course. Ranchers and interested groups may be trained in some topics.

5. Course should be taught on local level.

6. Develop course in FY 87 - part of this course has already been or is being developed.

7. Start teaching FY 88 to field offices.

DATA COLLECTION METHODS AND TECHNICAL PROFICIENCY

A. Introduction - The work group identified a need for training to insure technical competency in data collection.

B. Analysis -

1. We need to insure that the people currently collecting the data are technically proficient. While there is a need to do much more in some states, most states are comfortable with current workshops and

"recalibration" sessions. There was much discussion of the need for a "certification" procedure, i.e. should those collecting data be certified as competent in method A, B, and C, etc.? Also, there is general agreement that District staff is not active enough in quality control.

2. Due to budget, untrained people are assigned monitoring duties (or could be) but there is no handy training device to orient them to the task. PTC has developed the Vegetation Attributes video and is working on modules addressing frequency and density, production and composition, cover and structure. These modules would be extremely helpful for the untrained and as a refresher for those doing monitoring.

3. New employees, few as there are, have a training need that is being partially met by the PTC beginning range school.

4. Ranchers, consultants, and interested groups are getting involved in collecting data, some training is needed if the Bureau is going to use any of their data. The universities are involved in bringing the government and industry "up to speed" in most states.

C. Alternatives - Due to the range in training needed, a combination of methods must be used. Due also to the variety of methods used by the states and districts, training must be geared to the local level, utilizing the best available people especially university professors.

D. Recommended Actions -

1. W.O. should direct states to continue or implement, local proficiency reviews on resource area or individual basis. Document competency and provide recognition of training. Hold annual statewide workshops to address all aspects of rangeland management, emphasizing monitoring proficiency.

2. W.O. will direct PTC to finalize the planned modules; PTC should develop a module for climate/ utilization/actual use geared to technicians and ranchers. As needed, states should develop training modules utilizing university professors.

3. W.O. will direct PTC to continue monitoring training in beginning professional course.

4. W.O. should direct State to include rancher or interest group competency training should be done in conjunction with Bureau efforts 1 and 2, above. Involve these interests in workshops as much as possible.

E. Implementation -

1. Who is responsible?

States are responsible for insuring competency. Each state should prepare a policy for doing this, documenting it, and providing recognition of training received. States must insure that Districts are doing quality control.

PTC and DSC in consultation with the states are responsible for developing training modules plus states may develop modules as needed. PTC is responsible for beginning professional courses.

States are responsible to insure industry and interest group people involved are competent.

2. When will these actions be taken?

Full implementation by the end of FY 88.

3. Where will these actions take place?

Except for beginning professional training and state workshops, data collection training should be done on local level. (Resource Area)

ANALYSIS, INTERPRETATION, AND EVALUATION OF MONITORING DATA

A. Introduction - The BLM has made the transition from planning on a regional level to a site specific or activity planning level. At the activity planning level, management is implemented in accordance with the Land Use Plan on a grazing allotment after evaluating resource monitoring information. Possessing the skill and knowledge on completing a supportable and understandable allotment evaluation of all monitoring information is essential for all resource personnel since it is the precursor to arriving at management decisions and agreements.

The objective then is to provide effective training in allotment analysis, interpretation, evaluation, and management recommendations in time to meet the field's needs.

B. Analysis - Upon review of the existing situation, a need for new training was identified. Some of the general areas identified to be part of the training are:

1. A clear and easy to follow systematic allotment evaluation approach that includes and emphasizes coordination, cooperation and consultation with the livestock operator and affected interests.

2. Stressing monitoring as it relates to multiple use and the land use plan.

3. A clear understanding of what is offered by the various monitoring techniques available in relation to evaluating management.

4. Selective management and MIC considerations in determining monitoring level and intensity.

5. An understanding of the role that computers and statistical analysis play in storing and analyzing monitoring data.

6. How to determine the type and amount of data required to evaluate the short and long term effects of management.

C. Alternatives - New training should be developed for short and long term needs.

1. The technique to present it in the short term would be a classroom situation with exercises with an emphasis on an allotment evaluation work group exercise. Locally selected allotments would be used with all resource information for examples.

Long term would involve developing a teaching module or package that can be easily customized to the local needs.

2. Responsibility for providing the training would initially be the PTC followed by SO and DO's.

3. Who receives training?

a. PTC would train the trainers. This would be individuals identified from states to pass training on.

b. The trainers would train their respective states management and field staff.

c. It would be held in Phoenix initially then in each DO/RA in every state.

D. Recommended Actions

1. W.O. should direct PTC to, on a long term, develop training modules or packages to assist state instructors.

2. W.O. should direct PTC to, on a short term, develop and finalize a training program that is designed to meet local needs using a course outline such as:

Objective: With the information discussed in the lecture session and provided for the specific allotments in the work group exercise, the trainee will be able to analyze, interpret, evaluate, and make initial management recommendations for these local allotments in three days.

Sample Outline of Course:

I. Presentation with exercises

A. General approach to implementing the land use plan at the allotment level (10 basic steps that are not necessarily sequential.)

Coordination, cooperation, and consultation would occur as appropriate throughout all steps.

1. Review and compile all available existing information for the allotment, i.e., LUP, inventory, monitoring, past and present management, fences, waters etc.

2. Become familiar with the allotment on the ground.

3. Analyze, summarize, and display the allotment information in an easily readable and interpretable format, i.e., maps, overlays, tables, graphs, etc.

4. Summarize the allotment issues or resource concerns and develop allotment level objectives. They must reflect but in more detail the LUP objectives.

5. Identify and document the management system or plan for the allotment, whether it is simple or complex, the same or new.

6. Stratify the allotment into homogenous or repeatable units.

7. Identify and document the type, number, and location of studies required to monitor the effects of management in relation to the allotment objectives and establish them with supportive rationale.

8. Develop and document realistic, measurable, and attainable management objectives with timeframes for the allotment level and key management area level monitoring studies. They must be directly related to the allotment level objectives.

9. Identify and document the allotment evaluation approach and methods to be used to determine if the objectives are being met.

10. Identify and document the various options in management actions possible if the allotment objectives are met or if they are not met.

B. Selecting the appropriate field method.

C. Data Analysis

D. Interpretation - Cause and effect.

E. Evaluation

F. Management Recommendations

G. Evaluation documentation and support (6 way folder, maps, overlays, tables, narrative, etc.)

II. Allotment Evaluation Work Groups 5 persons maximum per group. Using locally selected allotments result is 80% completed product that is multiple resource oriented.

III. Work group results for each allotment evaluated with management recommendations are presented to local management staff (DM, AM, Chief of Resources, etc.) and critiqued.

E. Implementation -

1. Short Term

a. PTC develops workshop by March 1987 with assistance from DSC, DO, SO, and WO.

b. PTC starts workshops by April 1987, in Phoenix (multiple resource emphasis).

c. Each state start workshops by May 1987, and completes all resource areas by December 1, 1987. Minimum product would be one allotment evaluated per resource area.

2. Long Term - PTC develop training module or package for state instructors by September 30, 1988. DSC and field task group would assist using what is learned from short term efforts.

PUBLIC PARTICIPATION, CONSULTATION, COOPERATION, AND COORDINATION METHODS

A. Introduction - Consultation, Cooperation, and Coordination (CCC) with other individuals and organizations are key requirements in public land management. They are required by law and regulations. BLM policies stress participatory management approaches in all phases of management including rangeland monitoring.

Although CCC is a required element of management, there is a lack of understanding by BLM personnel and public land interests of what they mean and how they can improve BLM's management of the public lands. We now have in some states consultants, universities, and other rangeland interests demanding participation in public land monitoring programs. BLM has the responsibility to facilitate and guide these users of the public lands who appreciate the public lands and want to share in the management requirements.

To adequately perform the CCC in monitoring task, BLM personnel need additional training in various fields.

B. Analysis and Alternatives

1. Consultation, Cooperation, and Coordination - Need to be defined and explained to all employees.

2. Need Experiences in Stewardship Program Results and Conclusions and Principles made available for all offices and additional exposure.

3. Meeting facilitation training - PTC has trained one trainer for each state.

4. Conflict management training - presently offered by contract.

5. Communication skills type training - PTC offers a course for trainers.

C. Recommended Actions

1. Consultation, Cooperation, and Coordination - Defined and explained with memo by Washington Office Division of Rangeland Resources by June 2, 1987.

2. Exposure of Experiences in Stewardship Program - by PTC/SO/DO Training to Resource Area Staffs by 10/87.

3. Meeting facilitation training by State Offices to Train Resource Area Staffs.

4. Conflict Management - Obtained by District Managers to train Resource Area Staffs.

5. Communication Skills - PTC/State Offices to train Resource Area Staffs.

IV. Issue 3 - Technical Reference (4400 Series) Review

A. Introduction - The technical reference series on monitoring is a very beneficial guidance to the field office employee. This information has answered many questions on techniques and is considered a indispensable aid to the field monitoring personnel.

B. Analysis

1. Almost all those interviewed liked:

a. The readability of the guidance available.

b. Format of Manuals, Handbooks, and Technical References.

c. Like the flexibility provided and selection of techniques to meet local needs.

d. The availability of a comprehensive source of technical guidance.

2. Modifications and clarification was suggested as follows:

a. Some technical references contain forms that are not clearly printed.

b. Lack of sufficient copies in local offices.

c. Lack of statistical analysis procedures and assistance to evaluation.

d. A method of monitoring for low intensive allotments.

e. Technical Reference, 4400-7 Analysis, Interpretation. Evaluation does not present a systematic approach to evaluations.

f. A method to allow for modifications, updating, and corrections.

g. More technical guidance to assist in using the National Range Handbook.

h. Handbooks and technical references should make more reference to multiple use concept in monitoring data.

i. Confusion on Manual 4000 relationship to Manual 1600.

C. Recommended Actions - W.O. should direct PTC and DSC to incorporate the following changes on a continuous basis:

1. Maintain the Manuals, Handbooks, Technical References in current format.

2. Make the following modifications:

a. Provide a easier method for field personnel to obtain forms (i.e., print clear forms in technical references for photocopying; provide a master set of forms in the back of technical reference; and/or place monitoring forms on word processor for quick printing).

b. Provide a larger printing of guidance material at the first printing so copies will be available for all range conservationists Bureauwide.

c. Expand the statistical analysis portion of the Analysis, Interpretation, and Evaluation (AIE) Technical Reference by EOY FY 87.

d. Develop a less intensive occular reconnaissance procedure for monitoring low priority "M" and "C" allotments by EOY FY 87.

e. Provide training (as mentioned previously) or expand the AIE Technical Reference to present a more systematic approach to evaluation by end of FY 87.

f. At the back of the technical reference section, add a couple of "comment type postcards." These postcards would allow field personnel to tear them out, place comments, modifications, and/or updating of procedures and mail to the appropriate office for action. These changes should be made on a page by page basis with reissuance to all offices. With any modifications, a new cover of the technical reference will be printed with a new date on it to show currency.

g. Develop a technical reference to provide guidance on ecological site inventory and the National Range Handbook by EOY FY 87.

h. All updating of guidance should include a multiple resource aspect.

i. References between the 1600 and 4000 Manuals should be added by EOY FY 87.

D. Implementation of Actions - All recommended actions should be the responsibility of the Denver Service Center since they have overview of technical guidance. The use of work groups to address these recommendations may assist DSC. Recommendations c., d., e., g., and i. should be done by EOY FY 87 while the remainder should be done on a continuous basis.

V. Issue 4 - Technical Information Distribution

A. Introduction - The availability of good technical range information does not appear to be a problem. There is concern over the usefulness of the formats in which information is presented or where it can be found and the willingness of individuals to spend the time necessary to put the information to use.

B. Analysis of Existing Information Sources and Alternative for Change

1. Westfornet is an excellent source of technical information but difficult for individuals to review. Some filtering is needed to help get information to target group of users.

2. Information Bulletins - distribution to all field offices is working very well. Well used source of information.

3. Instruction Memorandum - basic element for policy distribution is well read and used. Problems exist because expiration dates regularly come and go without manualization being accomplished. The result is that the field ends up using "out of date" policy as a basis for action, placing them in an awkward situation should their actions be questioned.

4. Technical Research - i.e., Agricultural Research Service, should be requested and used by the BLM more often in management.

5. Technology Transfer Automated Retrieval System - recently identified system for providing updated technical information. More use is needed by the field.

6. Society for Range Management is an excellent source of technical data but it has considerable overlap with Westfornet. Interagency Range Information Committee is currently attempting to get abstracts of SRM articles in the Westfornet data base so it is all in one source.

7. Interstate exchange of ideas and approaches needs to be continually encouraged. Many beneficial tradings of information/techniques have been made with overall Bureauwide benefits. Utilize Denver Service Center's Resource Highlights to disseminate new or existing programs in the different states.

8. Denver Service Center Library provides Westfornet, lists of technical documents, and research services. It is an underused source of professional support in the form of literature searches on technical information, i.e., effects of grazing on winter fat, etc.

9. Agricultural Extension Service is a source of the most current research and applications.

10. Universities

11. Other Federal and State agencies

12. Denver Service Center Technical Notes - where are they now?

C. Recommended Actions/Implementation - W.O. should direct the following offices to:

1. State and District Office staff should immediately assume role of screening available technical information in an attempt to find what information that is useful at the field level.

2. State, District, and Area Offices need to cultivate contacts with universities, Extension Service, and other agencies specifically to promote the flow of technical information and expertise.

3. Each State should immediately begin to encourage regular intrastate and interstate interaction of rangeland monitoring staff to communicate effective ideas and techniques with a special emphasis on multi-disciplinary approaches.

4. DSC, States, and District Offices need to provide additional emphasis on the availability of services provided by the BLM Library including Westfornet, the research information capability, and how to access this capability. DSC should issue Information Bulletins on this by October 31, 1987.

5. DSC should be encouraged to produce BLM Technical Notes from information provided by field offices as a source for monitoring and management information. This may entail clarifying existing policy.

6. The WO should direct DSC periodically assemble a bibliography of all current guidance pertaining to monitoring and management policy and techniques for distribution to all field offices. The first edition should be provided by October 31, 1987.

7. DSC should provide guidance on how to prepare Technical Notes by October 31, 1987.

8. W.O. should issue Instruction Memoranda that represents policy that needs to be updated, revised, or extended before the expiration dates.

State	Pre-season Meeting	Monitoring	AIE	Program Coordination	ESI
Arizona	X	X		X	
California			X		
Colorado	X		X	X	X
Idaho	X		X		X
Montana	X		X		
Nevada	X	X	X	X	X
New Mexico			X		X
Oregon	X	X	X		X
Utah	X		X		X
Wyoming	X	X	X		X

*Not all employees dealing with monitoring attended these sessions.

Table 1. Current Available Training or Workshop by State During FY 81-86*

RANGELAND MONITORING WORKSHOP
HEADQUARTERS SUMMARY AND RECOMMENDATIONS

The workshop objective was to strengthen the rangeland monitoring program by sharing successful ideas and by resolving issues that appear to be impeding efforts. These rangeland monitoring issues were grouped into six general categories and work groups, led by an appointed chairperson.

Issue/ Workgroup	Chairperson
Monitoring Policy	Jens Jensen, Utah State Office
Correlation to Land Use Plan Objectives	Larry Walker, Oregon State Office
Technical Issues	John Willoughby, California State Office
Correlation To Inventory	Don Cain, Burns District Office
Information and Education	Tony Danna, Colorado State Office
Handling Monitoring Data	Leon Pack, Miles City District Office

The six work groups, involving three to seven individuals each, met prior to the workshop to analyze assigned issues and prepare draft recommendations for resolving problems and for improving the rangeland monitoring program.

These draft recommendations were presented to the group the first afternoon of the workshop. In addition, various BLM and interest group representatives presented ideas and suggestions to the more than 150 attendees of the workshop on Monday morning, January 12, 1987.

On January 13, the second day of the session, the issue work groups met separately but with input from an expanded number of participants since all workshop attendees were assigned to one of the six issue work groups. The draft recommendations were discussed at length and many were revised considerably based on input from the larger group.

The third day of the session, January 14, was devoted to presentations by university and BLM specialists and centered around technical issues and cooperative rangeland monitoring concepts.

January 15, the fourth day of the session, was devoted to work group meetings for attendees from each of the participating States. All attendees from each State met in their respective state groups to outline and discuss ways to improve the in-State monitoring effort. A representative of each State work group reported to the entire group their plans for applying information, techniques, and ideas gained from the workshop.

On January 16, the fifth day of the session, each issue work group chairman gave a final report of their recommendations followed by a close-out by the BLM Washington Office representative Billy Templeton, Chief, Division of Rangeland Resources.

From the six work groups, approximately 75 recommendations were made:

- 27 pertain primarily to Field Offices.
- 12 pertain primarily to the Denver Service Center or the Phoenix Training Center.
- 36 pertain primarily to the Washington Office.

The summary on the following pages includes recommendations made by the issue work groups and actions taken for each recommendation.

RECOMMENDATIONS	ACTIONS TAKEN
I. Monitoring Policy	I. Monitoring Policy
A. Washington Office (WO) should outline a timetable for developing Monitoring and Evaluation Plans, for initiating on-the-ground monitoring, and for developing agreements and issuing decisions.	A. A 5-year timetable is outlined in Manual 4400 (Draft); available for Field Office (FO) review 6/15/87.
B. WO should clarify national level reporting requirements for monitoring; both monitoring systems established and yearly monitoring accomplished.	B. Requirements for national reporting are outlined in Manual 4400 (Draft), available for FO review 6/15/87.
C. States should establish minimum monitoring standards; establish procedures for prioritizing allotments within categories and re-categorizing allotments based on results of monitoring.	C. All States now have or are developing minimum standards for monitoring.
D. WO should require FO's to develop monitoring and evaluation plans (MEP) for each land use plan area or Resource Area.	D. Manual 4400 (Draft) requires the preparation of monitoring and evaluation plans within 1 year of publication of the Record of Decision/ Range Program Summary (ROD/ RPS).
E. WO should revise the format for reporting "trend" in the National Report (Manual 4400) to differentiate "apparent trend" from "trend determined through monitoring."	E. Manual 4400 (Draft available for review 6/15/87) differentiates trend as recommended.
II. Correlating Monitoring To Land Use Plan Objectives	II. Correlating Monitoring To Land Use Plan Objectives
A. WO should "strengthen" BLM Manual 1734(.25) to clearly identify the need for developing an MEP prior to developing activity plans.	A. Manual 4400 (Draft) requires an areawide MEP to be developed within 1 year of issuance of the ROD/ RPS.
III. Correlating Monitoring To Inventory	III. Correlating Monitoring To Inventory
A. A number of recommendations were made. Generally summarized, WO should: 1. Strengthen BLM policy to: - Re-affirm BLM goal of completing ecological site inventory (ESI). - Require FO adherence to minimum standards for ESI. 2. Require FO adherence to minimum standards for ESI. 3. Require a standard soil survey with an ESI.	A. Manual 4400 (Draft) strengthens and clarifies BLM policy for ESI. Revision of Handbook H-4410-1 was considered at WO 220/ DSC 470 coordination meeting held August, 1987. Results will be forthcoming.

4. Require use of the Inventory Data System (IDS) for the storage, retrieval, and analysis of ESI data.	
B. WO/ DSC/ National Soil Range Team (NSRT) should develop new procedures for determining and reporting range condition based on management objectives.	B. A Workgroup for developing procedures for new method of determining and reporting range condition met 6/22-28 1987 in Reno, Nevada. Implementation procedures should be ready in FY 89.
IV. Technical Issues In Inventory And Monitoring	IV. Technical Issues In Inventory And Monitoring
A. WO/ DSC should update Technical Reference TR 4400-7 "Analysis, Interpretation, and Evaluation" by end of year 1987.	A. While it is recognized that some deficiencies exist in this TR, no plans exist for a WO/ DSC effort to update because of other, more critical needs in the Rangeland Monitoring Program. States have the option of issuing supplemental guidance consistent with existing policy to strengthen any specific deficiencies.
B. WO should adopt Bureauwide minimum monitoring standards.	B. Because of the ecological and sociological diversity that exists in the various FO's, it is BLM policy that States develop minimum standards. All States have or are developing minimum monitoring standards.
C. Technical References -	
1. WO/ DSC should add additional TR's to the existing series: Climate and Weather; Statistics; and Riparian (draft).	1. Draft of Climate TR will be available by end of year FY 87; no dates at this point for Statistics TR, but existing document "Lighter Side of Statistics" is available. Draft of TR "Riparian Grazing Management" is out for review by selected individuals this fiscal year.
2. WO/ DSC should revise TR 4400-3 Utilization; TR 4400-7 A.I.E.; and TR 4400-1 Planning for Monitoring.	2. TR 4400-1 Planning for Monitoring will be superseded by Handbook 4420-1 (Draft). There are no immediate plans for revising TR 4400-3 or TR 4400-7. Discussed at DSC 470/ WO 220 coordination meeting in August, 1987.
3. WO should revise Range Handbook sections on:	3.
a. ESI.	a. Manual 4400 (Draft) clarifies policy for ESI.
b. Range condition measurements.	b. Range condition measurement (See II. B.).
c. Allotment Categorization.	c. Allotment categorization is considered a planning function, treated in BLM Manual 1622, referenced in Manual 4400 (Draft).

D. National Policy should direct FO to select sufficient key areas/ units to allow for annual changes in grazing pressure associated with intensive grazing systems.	D. State minimum monitoring standards specify requirements for selecting key areas. "Monitoring and Evaluation" recommends this approach.
E. National policy should direct FO to collect data on all species for a monitoring site. Depending on management objectives, focus subsequent monitoring on "key" species or several species.	E. Concur. However, criteria should be discussed in State Minimum Standards.
F. WO policy should specify the use of "field notes" (i.e., use supervision) as indicators for determining if more intensive monitoring is needed on lower priority category allotments ("C" and some "M") and as supplemental information on higher priority allotments ("I" and some "M").	F. See IV. D.
G. WO should modify BLM policy on ESI to allow FO's to describe ecological sites and PNC on a composition-by-weight basis, a composition-by-cover basis, or both, and allow updating of ecological status based on cover data.	G. BLM will continue the policy of describing ecological sites and PNC and updating ecological status based on composition by weight as outlined. FO's have, in Handbook H-4410-1, the option of collecting cover data or other attributes as necessary.
V. Handling Monitoring Data	V. Handling Monitoring Data
A. Organization of Monitoring Data and Files -	A.
1. WO should develop a manual, handbook, or technical reference outlining a standard system for the storage of monitoring data.	1. Range Recordkeeping Handbook Work Group began developing a standard system 6/23/87. Draft available for review by end of year FY 87.
2. WO should evaluate monitoring policy for application to all renewable resource activities and require a coordinated monitoring approach. Emphasize management objectives, include statement about fire rehabilitation.	2. Manual 1734 provides for a coordinated approach to monitoring. Manual 4400 (Draft) and Handbook H-4420-1 (Draft) also emphasizes a coordinated approach.
3. WO policy should consider implementing a "Management Unit" planning approach, integrating all program activities for a management unit.	3. This recommendation will be considered by the Range Recordkeeping Handbook Workgroup (see a. above). Requires approval of Bureau Management Team.
B. Hardware Requirements -	B.
1. WO policy should specify that all future hardware acquisitions be IBM PC (MS-DOS) compatible.	1. Will forward recommendation to Support Services (WO 770). These recommendations are being considered in the Bureauwide Modernization Study.
2. WO should delegate approval authority for acquisition of PC's, related hardware, and software to the lowest possible level.	2. See 1. above.

3. WO should remove ceiling amount that States may spend for ADP purchases without WO approval.	3. See 1.
4. WO should direct FO's to allow resource specialist to freely use computers and locate computers in resource specialist work areas.	4. These are FO management considerations and decisions.
	NOTE: Recommendations 1, 2, and 3 will require review and consideration by WO Management Services, and Support Services. To implement them will require a policy change through the Bureau Management Team.
C. Software -	C.
1. WO should promote the training of resource specialists in the capabilities and use of BLM standard software packages.	1. Also a FO concern. If the job requires standard software packages, FO managers must ensure that their people are properly trained in its application and use.
2. Newly developed programs providing significant application and advantage for field use should be approved by WO.	2. The Range ADP Workgroup (RADPWG) will screen newly developed programs and recommend application on an annual basis. Also requires approval of WO 770 (Support Services).
3. WO should direct SD's to establish a New Software Developments Evaluation Program to determine their application to resource management. Evaluation should involve individuals with field experience.	3. RADPWG will conduct an evaluation in FY 88.
4. WO/ DSC should develop storage and analysis software packages, including graphics capability for commonly used monitoring and evaluation techniques.	4. The recommendation will be brought forward when RADPWG convenes during FY 88 and will be considered thereafter annually.
D. New Technology -	D.
1. WO/ DSC should initiate a pilot program to field test the Polycorder 600 or similar device(s).	1. DSC as well as at least three FO's are currently testing or planning to test devices. Results will be summarized and made available to FO's during FY 88.
2. BLM should immediately acquire and apply the above technology.	2. Recommendation is contingent upon results of field testing during FY 87/88. FO's have authority to purchase and test.
E. Information Sharing -	E.
1. DSC should establish and maintain an Electronic Monitoring Information System (EMIS) for use by all FO's.	1. These recommendations will be forwarded to the SC Director. Implementation will depend on available resources consistent with current T.O's and Budget.
2. DSC Director should designate a DSC staff person to manage EMIS.	2. See E. 1. above. A newsletter was prepared by DSC (Eshelman) and sent to range program leaders 6/16/87.

3. WO/ DSC should organize a monitoring ADP work group to develop and promote monitoring ADP information efforts.	3. WO 220/ DSC 470 discussed this recommendation at a coordination meeting in 8/87. Results will be forthcoming. Also see E. 1.
F. Geographic Information System (GIS) -	F.
1. WO/ DSC should continue coordination and communication efforts with GIS.	1. Currently an on-going effort. DSC has lead (John Foster- coordinator).
2. DSC should refine computer graphics capability for monitoring application.	2. WO will forward this recommendation to DSC. Application will be limited to FO's with GIS capability.
VI. Information And Education	VI. Information And Education NOTE: For additional information relative to monitoring training, see Attachment 1.
A. Current Training - WO should issue an Instruction Memorandum to FO to:	A. The responsibility for training is primarily a FO function.
1. Provide or continue to provide coordination, and to make training and workshop available to all personnel involved in rangeland monitoring beginning in FY 87.	1. Monitoring training is best accomplished at the local level because of the diversity of standards and techniques. The concept of monitoring as a management function will be conveyed in part 4000-1 and 4000-7 of the Grazing Regulations.
2. Make "refresher" courses available to increase proficiency of monitoring personnel.	2. See A. 1. above.
3. Take advantage of intra-State training.	3. Beginning in FY 88, PTC (Dreier) will poll State Monitoring Program Leaders and compile a list of planned inventory/ monitoring training and make this list available to all State Program Leaders.
4. Make monitoring training available to all renewable resource specialists at the Resource Area level.	4. See A. and A. 1. above and Attachment 1.
5. States should provide PTC a schedule of training and workshops. Results should be consolidated and made available to other States.	5. See A. 3. above.
B. New Training Needs - WO should direct PTC to develop and implement training courses for:	B. See Attachment No. 1.
1. Ecological Site Concept - training course (eight segments) should be taught in individual segments (modules) or as a whole.	
2. Technical Proficiency - modules should be developed for climate, utilization, and actual use studies. Training should be oriented to ranchers and technicians and involve academia.	

a. Continue to provide technical training in "Beginning Professional" courses.	
b. WO should direct States to:	
- Implement local proficiency reviews, document results, and provide recognition. Hold Statewide workshops for addressing all areas of rangeland management including monitoring.	- Quality control is a State Director responsibility.
- Provide training for ranchers/ interest groups in rangeland monitoring.	- FO responsibility.
3. Analysis, Interpretation, and Evaluation	
a. Training should be designed to meet local needs and in training modules to assist States in providing training.	a. See Attachment No. 1.
4. Public Participation, Consultation, Cooperation, and Coordination Methods.	4.
a. WO should define and explain consultation, cooperation, and coordination in a memorandum to FO's by 6/2/87.	a. A current Instruction Memorandum and existing policy adequately define consultation, cooperation, and coordination as well as furnish direction for incorporating it in all rangeland management programs.
b. PTC/ SO/ DO should provide training to Resource Area staffs in successful principals of ESP program by 10/87. SO should provide meeting facilitation training to Resource Area staffs. DM's should provide conflict management training to Resource Area staffs. PTC/ SO should provide communication skills training to Resource Area staffs.	b. Revised Memorandum of Understanding (MOU) for Coordinated Resource Management was signed 7/2/87. The MOU provides emphasis and direction for incorporating ESP concepts in resource management. SD's and other FO managers plan and coordinate this type of training.
C. Review of Technical Reference (4400) Series -	C. Review of Technical Reference (4400) Series -
NOTE: WO should direct PTC/ DSC to make following changes on a continuing basis:	
1. Maintain Manuals/ Handbooks and technical references in current format.	1. No change in format is planned. Formats for Manuals/ Handbooks are specified in Manual 1221 (Rel. 1-1463) Directives, and Handbook H-1221-1 (Rel. 1-1464) Writing and Formating Directives.
2. Make the following modifications:	2.
a. Develop an easier method to obtain field forms used for monitoring (provide "master" set of forms which are easily photocopied).	a. Policy requires that all national forms be numbered and approved by OMB. As forms are revised, or deleted, approved ones are made available. Using a set of "master" forms in handbooks or manuals would negate this process.

b. Provide more first printing copies of Manuals/ Handbooks and technical references to FO's.	b. WO will provide when revisions or printing are sent to the Field.
c. Expand the statistical analysis portion of TR 4400-7 (AIE) by end of year FY 87.	c. No immediate revision of TR 4400-7 (AIE) is planned. States may, if necessary, issue supplemental guidance.
d. Develop procedures for less intensive monitoring of low priority "M" and "C" allotments by end of year FY 87.	d. Each state is responsible for developing minimum monitoring standards.
e. Expand TR 4400-7 (AIE) for a more systematic approach to allotment monitoring evaluation.	e. See 2. c.
f. Add "comment" cards or pages with address of appropriate office, to send comments or suggestions.	f. WO will add "comment" cards on all future TR's.
g. Develop a TR for ESI by end of year FY 87.	g. Will develop TR for ESI during FY 88 based on PAWP.
h. All updated guidance should take a multiple resource aspect.	h. This is BLM policy.
i. 4400 Manual update should reference 1600 Manuals by end of year FY 87.	i. References to 1600 Manuals are now cited in Manual 4400 (Draft) which was distributed to FO's 6/15/87.
D. Technical Information Distribution -	D.
WO should direct specific offices to:	
1. SO/ DO should screen technical information and alert FO's to useful information.	1. State Director responsibility. However, numerous sources of information already available to all FO's: Westfornet, USDA Forest Service Research Bulletins; Professional Society publications, and bulletins from Extension and other agencies.
2. SO/ DO/ RA should cultivate better contacts with academia to promote flow of useful information.	2. See D. 1. above.
3. SO should encourage regular interstate and intrastate exchange of successful ideas and techniques for monitoring.	3. See D. 1. above.
4. DSC/ SO/ DO should provide emphasis for using services of BLM Library, Westfornet, through a WO Information Bulletin by 10/31/87.	4. See D. 1. above.
5. DSC should compile technical notes on successfully applied monitoring techniques.	5. Discussed at DSC 470/ WO 220 coordination meeting in August, 1987. Results will be forthcoming.

6. WO should direct DSC to periodically publish for FO use, a bibliography of current monitoring policy/ techniques by 10/31/87.	6. See D. 1. above.
7. WO should update monitoring policy before Instruction Memorandums expire.	7. Monitoring policy is in Manual 4400 (Draft) distributed for FO review 6/15/87.

ATTACHMENT 1.

June 25, 1987
Gary Dreier, PTC
FTS 261-2651

Dear Glen:

I have reviewed the Monitoring Workshop Information and Education Work Group recommendations. Most of their recommendations match the current direction of training. Some of their deadlines are unrealistic, some already past. I will deal with their recommendations as they pertain to bureauwide (PTC) training.

I was glad that the recommendations so closely match the direction of PTC's range training. PTC is doing the following.

1. Packaging monitoring techniques for self/group use.
2. Placing more emphasis on conflict management in the AMP course.
3. Producing an ecological site concept package for self/group use.
4. Developing case studies on data interpretation and evaluation.
5. Stressing communication skills in all range courses.
6. Focusing the AMP course more at evaluation.
7. In the talking stages with DSC on a study design course.

The biggest problem facing the range training program is the inability for PTC to get training to the field quick enough to meet needs. The program has made a significant shift toward packaging, without dropping the current classroom training. The development time required to package has not been at the level that the field desires, as noted by the work group recommendations.

At present, the training for managers for the range program has only been dealt with as spin-offs of technical training. As a training package is developed, its ability to train managers is incorporated. Training managers has been secondary to the training of technicians.

The recommendations of the work groups are included on the following pages in the order of the report. A brief description starts off each category. A tabular summary is included of the work group's recommendations, the present PTC existing situation, and my proposal to you. In the table, technicians means range conservationists and range technicians.

Gary Dreier

ECOLOGICAL SITE CONCEPT (ESC)

The current thrust is toward the technician, with limited training for managers. The present method of training ESC is the range professional course (4000-1), but an ESC training package is near completion and should be ready for field use at the beginning of FY88. The package will deal with understand and use of present ESC data, it will not teach technicians on how to map or correlate. The package is composed of 2 video tapes and a written guide.

The draft course defined by the work group seems overly extensive for ESC, and more defines the entire monitoring program, so I will not break it out for ESC except the video tape from the Director. Currently, I do not have a Director's video tape planned, I feel that this is a policy and direction problem, which could be done by PTC if other avenues are not available. I think that to get the widespread impact desired, the BLM Magazine could be an excellent media.

ECOLOGICAL SITE CONCEPT

	Work Group Recommended	Existing Situation	PTC Proposed
Target	Managers	Managers	Managers
Conduct @	SA & DO	NONE	SA & DO
Schedule	FY1988		FY1988
Type	Packaged		Packaged (Partial)*
Instructor	SA & DO		Self/Group
Title	ESC		ESC
Managed	State Field Instr		PTC (SO Distributes)
Subjects	Multiple Use		ESC/SRS
	ESC/SRS		RISC
	RISC		Law/Reg/Policy
	Law/Reg/Policy		
			KEEP EXISTING PLUS:
Target	Technicians	Technicians	Technicians
Conduct @	SA & DO	PTC (4000-1)	SA & DO & SO
Schedule	FY88 Run/FY87 Design	Yearly	FY88
Type	Packaged	Classroom	Packaged
Instructor	State, Field Instr's	Bureauwide	Self/Group
Title	ESC	Range Professional	ESC
Managed	SO	PTC	PTC (SO Distributes)
Subjects	Law/Reg/Policy	Law/Reg/Policy	Law/Reg/Policy
	RISC	RISC	RISC
	ESC/SRS	ESC/SRS	ESC/SRS
	Tech Proficiency	Tech Proficiency	Tech Proficiency
	Data Interpretation	Data Interpretation	Data Interpretation
	Key Area	Key Area	
	Consistency	Consistency	
	Communication	Communication	
	EIC	EIC	

NOTES: *The package is designed for technicians, but has introductory material included that is suitable for manager's training.

DATA COLLECTION METHODS AND TECHNICAL PROFICIENCY

The work group recommendations placed most of the responsibility of the training on the states. I believe that a bureauwide training course is impossible to meet the varied needs of the states, since each state is using techniques and procedures that are unique to their situation.

The range professional training (4000-1) again has a 1 week field training session. The technicians learn how to analysis, interpret, and evaluate the data. The technicians will use statistics and computers in the course.

PTC has produced the first package (Vegetation Attributes) in a series of packages on techniques of monitoring vegetation attributes. A frequency and density package should be in the field in FY88. The remaining parts should be available the close of FY89. This curriculum will help translate the technical reference series to the field.

A course on monitoring study design is in initial talking stages with DSC. It will deal with monitoring design and techniques.

DATA COLLECTION METHODS AND TECHNICAL PROFICIENCY

	Work Group Recommended	Existing Situation	PTC Proposed		
Target	Technicians	Technicians	Technicians	Technicians	Technicians
Conduct @	PTC & SA & DO	PTC	PTC	SA & DO	PTC
Schedule	FY88	Yearly	Yearly	FY89	FY89-90
Type	Packaged & Classroom	Classroom	Classroom	Packaged	Classroom (Field)
Instructor	Self/Group	Bureauwide	Bureauwide	Self/Group	Bureauwide
Title	Monitoring Techniques	Range Professional	Range Professional	Monitoring Techniques*	Monitoring Techniques
Managed	PTC/DSC	PTC	PTC	PTC	PTC
Subjects	Measure Attributes Climate & Use	Measure Attributes Climate & Use	Measure Attributes Climate & Use Study Design Statistics Interpretation	Measure Attributes Climate & Use	Measure Attributes Climate & Use

NOTES: *This is a series of packages, starting with Vegetation Attributes and continues through techniques involved in monitoring the attributes. The curriculum will include production, frequency, density, composition, and cover, with structure held till later.

ANALYSIS, INTERPRETATION, AND EVALUATION (AIE)

The work group has recommended a specific methods and a time table to meet training needs. The work group identified a large audience to receive the training; consequently, a train-the-trainer approach was recommended. The group wanted PTC to train trainers from each state to take the training back and provide the training locally. This strategy is excellent for training a large target group; however, what to train is not so clear. A course that could easily transfer a facilitated training package to such a wide audience seems difficult. The course could be changed to a seminar comprised of state, DSC, and WO people that would discuss their ways of doing AIE, then go back to the field and hold a similar seminar seems a better approach.

The range professional training (4000-1) will deal with this subject in a 1 week field training setting. The technicians will not become proficient at monitoring technique, but aware of proper methodology and techniques.

Two planned short video packages case studies (Vale and Rock Springs) will show how 2 areas have interpreted, evaluated, and used "hard" and "soft" data to make resource decisions.

ANALYSIS, INTERPRETATION, AND EVALUATION

	Work Group Recommended	Existing Situation	PTC Proposed		
Target	Technicians	Technicians	Technicians	Technicians	Technicians
Conduct @	PTC There/ SO Tng	PTC (4000-7)	PTC (4000-7)	RA & DO & SO	RA & DO & SO
Schedule	3-87 PTC/ 4-87 SO	Yearly	Yearly	FY88	FY88
Type	Train-tner/SO Workshop	Classroom	Classroom	Packaged	Packaged
Instructor	SO/RA Facilitated	Bureauwide	Bureauwide	Self/Group	Self/Group
Title	AIE	AMPs	AMPs	Vale Case Study	Rock Springs Case Study
Managed	PTC Develop / SO Run	PTC	PTC	PTC (SO Distributes)	PTC (Distributes)
Subjects	C-C-C	C-C-C	C-C-C	C-C-C	C-C-C
	Multiple Use	Multiple Use	Multiple Use	Multiple Use	Multiple Use
	RIC	RIC	RIC	RIC	RIC
	Interpret Data	Interpret Data	Interpret Data	Interpret Data	Interpret Data
	Techniques			Techniques	Techniques
	Computers				
	Statistics				

PUBLIC PARTICIPATION, CONSULTATION, COOPERATION, & COORDINATION

The field rates communication skills as highly desirable and needing more training. Most of the training in these skills can be obtained from vendors; however, fitting some of this training to the BLM's needs is not always possible.

PTC provided a train-the-trainer course on meeting facilitation last year to each state. Each state and PTC have trainer(s) available. The meeting facilitation package is scheduled for revision in FY88.

The Safford DO has requested PTC produce a documentary video tape on an operator in the stewardship program for their presentation in August 1987. This could possibly be an excellent awareness package for BLM.

The AMP course (4000-7) conducts a 1/2 day conflict management session.

PUBLIC PARTICIPATION, CONSULTATION, COOPERATION, & COORDINATION

	Work Group Recommended	Existing Situation	PTC Proposed
			USE EXISTING PLAN:
Target	Technicians	Technicians	Managers
Conduct #	RA & DO	PTC (4000-1)	RA & DO
Schedule	10-87	Yearly	FY87
Type	Packaged	Classroom	Packaged
Instructor	DO & SO	Bureauwide	Self/Group
Title	Stewardship	Range Professional	Day Case Study
Managed	PTC	PTC	Safford DO
Subjects	Exposure to Pgm	Exposure to Pgm	Pgm Experiences
	Pgm Experiences	Law/Reg/Policy	
Target	Technicians	Technicians	Technicians
Conduct #	RA & DO & SO	RA & DO & SO	RA & DO & SO
Schedule	Immediately	Train-Tner Done	Train-Tner Done
Type	Facilitated	Facilitated	Facilitated
Instructor	SO	SO	SO
Title	Meeting Facilitation	Meeting Facilitation	Meeting Facilitation
Managed	PTC Developed/SO Run	PTC Developed/SO Run	PTC Developed/SO Run
Subjects	Meeting facilitation	Meeting facilitation	Meeting facilitation
Target	Technicians	Technicians	Technicians
Conduct #	RA & DO	PTC (4000-7)	PTC (4000-7)
Schedule	Immediately	Yearly	Yearly
Type	Facilitated	Classroom	Classroom
Instructor	DO	Bureauwide	Bureauwide
Title	Conflict Mgt	Conflict Mgt	Conflict Mgt
Managed	?	AMPs	AMPs
Subjects	Conflict Mgt	Conflict Mgt	Conflict Mgt
Target	Technicians	Technicians	Technicians
Conduct #	RA & DO	PTC	PTC
Schedule	Immediately	Yearly	Yearly
Type	Facilitated	Classroom	Classroom
Instructor	PTC & SO	Bureauwide	Bureauwide
Title	Communications	Foundations	Foundations
Managed	PTC & SO	PTC	PTC
Subjects	Communications Skills	Communications Skills	Communications Skills

Appendix A

Rangeland Monitoring Workshop Schedule

SUNDAY-JANUARY 11, 1987 REGISTRATION

1:00 - 10:00 pm Registration/Poster session Set-up (Main Foyer)

MONDAY-JANUARY 12, 1987 FIRST GENERAL SESSION (Salon D)

General Session Chairman - Bob Moore, Service Center Director

8:00 am Welcome - Bob Moore, Service Center Director
8:10 am Opening Remarks - Neil Morck, Colorado State Director
8:30 am Maitland Sharpe - Izaac Walton League of America
9:00 am Bud Eppers - National Cattlemans Association
9:30 am F.E. Busby - Society For Range Management
9:50 am Questions and Answers
10:00 am Break
10:30 am Henry Smith, Associate Director, Land and Renewable Resources
11:00 am Dave Tidwell, Special Assistant To The Director
11:30 am Discussion, Questions, and Answers
12:00 pm Lunch

Monday-January 12, 1987 SECOND GENERAL SESSION (Salon D)

General Session Chairman - Glen Secrist, Division of Rangeland Management

1:00 pm Workshop Details - Kris Eshelman, Denver Service Center
1:10 pm Issue Work Group Draft Reports
  Monitoring Policy - Jens Jensen, Utah State Office
  Correlating Monitoring To Land Use Plan Objectives - Larry Walker Oregon State Office
  Correlating Monitoring To Inventory Data - Steve Leonard National Soil Range Team
  Technical Issues - John Willoughby, California State Office
3:00 pm Break
  Handling Monitoring Data - Leon Pack, Miles City District Office
  Information and Education - Tony Danna, Colorado State Office
4:30 pm Discussion

5:00-7:00 pm Reception - Hosted by the Denver Marriott West (Foyer/Salon A)
8:00 pm State Monitoring Coordinators Meet (Suite 623) - Glen Secrist/Kris Eshelman
8:00 pm Demonstration Grazing Authorization and Billing System - Last Names A-K (Beaver Creek/Vail)
9:00 pm Demonstration Grazing Authorization and Billing System - Last Names L-Z (Beaver Creek/Vail)

TUESDAY-JANUARY 13, 1987 ISSUE WORK GROUPS MEET

8:00 am Issue Work Group Meetings
  Monitoring Policy - Salon D
  Correlation to Land Use Plan Objectives - Salon C
  Correlation To Inventory - Salon F
  Technical Issues - Aspen
  Handling Monitoring Data - Salon H
  Information/Education - Salon G
10:00 am Break
12:00 pm Lunch
1:00 pm Issue Work Group Meetings Continue
3:00 pm Break

7:30-10:00 pm Microcomputer Hardware/Software Demonstration (Salons G and H)
  DBASE 3+, PC FOCUS, ASPEN, Lotus 123,
  Omni Data Corporation - Portable Field Data Collection Devices.

Appendix A
Rangeland Monitoring Workshop Schedule

WEDNESDAY-JANUARY 14, 1987 THIRD GENERAL SESSION (Salon D)

General Session Chairman - Willy Peterson, Acting Branch Chief, Range Management

8:00 am Technical Papers - Pete Jackson, Executive Vice-President Society For Range Management, Moderator
8:05 am Lamar Smith, University of Arizona
8:30 am Bill Laycock, University of Wyoming
8:55 am Wayne Burkhardt, University of Nevada-Reno
9:20 am Dave Bryant, University of Idaho
9:45 am Bud Eppers, National Cattlemans Association
10:00 am Break
10:30 am BLM Technical Papers-
10:35 am Climate/Weather - Bill Wagner, Utah State Office
10:55 am Adjusting Categorization and Prioritization - Jerry Townsend, New Mexico State Office
11:15 am Monitoring Decisions - Sucess and Failure - Larry Humphrey, Safford District
11:35 am Quality Control Through Field Review and Assistance - Robert Stager, Nevada State Office
11:55 am Discussion/Questions and Answers
12:00 pm Lunch (State Office, WO, SC Monitoring Coordinators Luncheon - Goldfields Restaurant)

WEDNESDAY-JANUARY 14, 1987 STATE WORK GROUPS MEET

1:30 pm State Work Group Meetings (See Posted Schedule)
3:00 pm Break
3:30 pm State Work Group Meetings Continue

5:00-6:30 Reception - Hosted by the Denver Marriott West (Salon E)
7:30 pm Open Discussion - Washington Office (Salon D)

THURSDAY-JANUARY 15, 1987 STATE WORK GROUPS MEET

7:00 am Breakfast, Banquet Style - (Salon D)
  Host - Neil Morck, Colorado State Director
  Guest Speaker - Kendall Johnson, Utah State University
8:30 am State Work Group Meetings Continue
10:00 am Break
12:00 am Lunch
1:00 pm State Work Group Meetings Continue
2:30 pm State Work Group Reports (Salon D)
5:30 pm Shuttles begin departing to National Western Stockshow
5:45 pm Last call for transportation to National Western Stockshow

FRIDAY-JANUARY 16, 1987 FOURTH GENERAL SESSION (Salon D)

General Session Chairman - Billy Templeton, Chief, Division of Rangeland Resources

8:00 am Final Issue Work Group Reports-
10:00 am Break
10:30 am Open Discussion-
11:30 am Close out - Henry Smith
12:00 pm Have a good lunch and a safe trip home!
1:00 pm Issue and State Work Group Chairpersons meet with WO/DSC (Suite 623)

Appendix B
Issue Work Group Assignments

NAME	WORK GROUP POSITION	POSITION	OFFICE	ADMINISTRATIVE UNIT
** ***ALL WORK GROUPS***				
ESHELMAN, KRIS	COORDINATOR	RANGE CONSERVATIONIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
SECRIST, GLEN	COORDINATOR	RANGE CONSERVATIONIST	DIVISION OF RANGELAND RESOURCES	WASHINGTON OFFICE
BENNETT, K LYNN	ADVISOR	SPECIAL ASSISTANT	LAND & RENEWABLE RESOURCES (200)	WASHINGTON OFFICE
SMITH, HANK	ADVISOR	ASSISTANT DIRECTOR	LANDS & RENEWABLE RESOURCES	WASHINGTON OFFICE
TEMPLETON, BILLY	ADVISOR	DIVISION CHIEF	DIVISION OF RANGELAND RESOURCES	WASHINGTON OFFICE
TIDWELL, DAVID	ADVISOR	SPECIAL ASSISTANT TO THE DIRECTOR	SPECIAL ASSISTANT TO THE DIRECTOR	WASHINGTON OFFICE
** ***CORRELATION TO INVENTORY***				
CAIN, DON	CHAIRMAN	ASSOCIATE DISTRICT MANAGER	BURNS DISTRICT	OREGON
MITCHELL, BOB	CO-CHAIRMAN	MONITORING SPECIALIST	IDAHO STATE OFFICE (931)	IDAHO
HENDERSON, DAVE	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	KEMMERER RESOURCE AREA	WYOMING
LINDSEY, KATHY	MEMBER	RANGE SPECIALIST	ELY DISTRICT	NEVADA
SPARKS, KELLY	MEMBER	RANGE CONSERVATIONIST	LITTLE SNAKE RESOURCE AREA	COLORADO
TAYLOR, JERRY	MEMBER	RANGE CONSERVATIONIST	BRUNEAU RESOURCE AREA	IDAHO
BIRCH, TOM	ADVISOR	RANGE SPECIALIST	LAS CRUCES DISTRICT	NEW MEXICO
BLYMYER, MIKE	ADVISOR	WILDLIFE BIOLOGIST	MONTROSE DISTRICT	COLORADO
BRUBAKER, DALE	ADVISOR	BRANCH CHIEF-BIOLOGICAL RESOURCES	COLORADO STATE OFFICE (933)	COLORADO
HALVORSON, RON	ADVISOR	MONITORING SPECIALIST	PRINEVILLE DISTRICT	OREGON
HAMILTON, CAROLE	ADVISOR	BRANCH CHIEF-BIOLOGICAL RESOURCES	ARIZONA STATE OFFICE (932)	ARIZONA
KWIATKOWSKI, JOHN	ADVISOR	DEPUTY STATE DIRECTOR- L & R R	MONTANA STATE OFFICE (930)	MONTANA
LEONARD, STEVE	ADVISOR	RANGE SCIENTIST	NATIONAL SOIL-RANGE TEAM	WASHINGTON OFFICE
LIKINS, JOHN	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	LANDER RESOURCE AREA	WYOMING
MC CLURE, BEAUMONT	ADVISOR	DEPUTY STATE DIRECTOR- L & R R	ARIZONA STATE OFFICE (930)	ARIZONA
MILES, RAY	ADVISOR	SOIL SCIENTIST	NATIONAL SOIL-RANGE TEAM	WASHINGTON OFFICE
RIETZ, JACK	ADVISOR	RANGE SPECIALIST	SAFFORD DISTRICT	ARIZONA
SCHIVE, JOHN	ADVISOR	RANGE SPECIALIST	MOAB DISTRICT	UTAH
TIPPY, DAN	ADVISOR	SOIL SCIENTIST	HAVRE RESOURCE AREA	MONTANA
WAGNER, BOB	ADVISOR	RANGE SCIENTIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
** ***CORRELATION TO PLANNING***				
WALKER, LARRY	CHAIRMAN	MONITORING SPECIALIST	OREGON STATE OFFICE (932)	OREGON
HENKE, STEVE	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	FARMINGTON RESOURCE AREA	NEW MEXICO
HINES, BRAD	MEMBER	RANGE SPECIALIST	NEVADA STATE OFFICE (931)	NEVADA
PHILLIPS, BILL	MEMBER	RANGE SPECIALIST	SUSANVILLE DISTRICT	CALIFORNIA
TROGSTAD, RON	MEMBER	AREA MANAGER	DIAMOND MOUNTAIN RESOURCE AREA	UTAH
VOLK, BILL	MEMBER	MONITORING SPECIALIST	MONTANA STATE OFFICE (931)	MONTANA
BLINCOW, GARY	ADVISOR	RANGE SPECIALIST	WORLAND DISTRICT	WYOMING
COLOFF, STAN	ADVISOR	NATURAL RESOURCE SPECIALIST	BRANCH OF SOIL, AIR, & WATER	WASHINGTON OFFICE
CROCKETT, BOB	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	LAS CRUCES/LORDSBURG RESOURCE AREA	NEW MEXICO
DENKER, JOHN	ADVISOR	RANGE SPECIALIST	CRAIG DISTRICT	COLORADO
HIGGINS, LEE	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	LOWER GILA RESOURCE AREA	ARIZONA
LODZINSKI, DAVID	ADVISOR	ASSOCIATE DISTRICT MANAGER	VALE DISTRICT	OREGON
MARY, DOUG	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	WELLS RESOURCE AREA	NEVADA
MC CRAE, TED	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	SAN SIMON RESOURCE AREA	ARIZONA
MELTON, JIM	ADVISOR	AREA MANAGER	PLATTE RIVER RESOURCE AREA	WYOMING
PIZEL, ROBERT	ADVISOR	ENVIRONMENTAL MGT. SPECIALIST	DIVISION OF PLANNING	WASHINGTON OFFICE

SAZAMA, JAMES	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	ROYAL GORGE RESOURCE AREA	COLORADO
SHORT, DARRELL	ADVISOR	RANGE CONSERVATIONIST	DIVISION OF PROGRAM EVALUATION	WASHINGTON OFFICE
SPENCER, ELBERT	ADVISOR	BRANCH CHIEF-BIOLOGICAL RESOURCES	WYOMING STATE OFFICE (932)	WYOMING
WRIGHT, RICHARD	ADVISOR	RANGE SPECIALIST	BURLEY DISTRICT	IDAHO
ZIMMER, JOE	ADVISOR	DEPUTY STATE DIRECTOR- L & R R	IDAHO STATE OFFICE (930)	IDAHO

** *HANDLING MONITORING DATA*

PACK, LEON	CHAIRMAN	NATURAL RESOURCE SPECIALIST	MILES CITY DISTRICT	MONTANA
JAKUBOWSKI, JAKE	CO-CHAIRMAN	RANGE SPECIALIST	CANON CITY DISTRICT	COLORADO
ANDERSON, ANDY	MEMBER	RANGE SPECIALIST	CARSON CITY DISTRICT	NEVADA
DELANEY, LEE	MEMBER	AREA MANAGER	SURPRISE RESOURCE AREA	CALIFORNIA
GLENN, DON	MEMBER	RANGE SPECIALIST	RAWLINS DISTRICT	WYOMING
ROUNDY, ELNO	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	KINGMAN RESOURCE AREA	ARIZONA
ANDERSON, GLADE	ADVISOR	RANGE SPECIALIST	SALT LAKE CITY DISTRICT	UTAH
BURKE, TIM	ADVISOR	RANGE SPECIALIST	BAKERSFIELD DISTRICT	CALIFORNIA
CONN, KEMP	ADVISOR	ASSOCIATE STATE DIRECTOR	UTAH STATE OFFICE (910)	UTAH
DAUGHTON, BRUCE	ADVISOR	RANGE SPECIALIST	CASPER DISTRICT	WYOMING
FIELD, LARRY	ADVISOR	NATURAL RESOURCE SPECIALIST	KOBUK DISTRICT	ALASKA
FOSTER, JOHN	ADVISOR	NATURAL RESOURCE SPECIALIST	ALMRS/GIS (D150)	DENVER SERVICE CENTER
HARBOUR, GRANT	ADVISOR	RANGE SPECIALIST	SALMON DISTRICT	IDAHO
JENSEN, ARLEN	ADVISOR	RANGE SPECIALIST	CEDAR CITY DISTRICT	UTAH
KATHMAN, DAVE	ADVISOR	NATURAL RESOURCE SPECIALIST	DIVISION OF RESOURCES (D471)	DENVER SERVICE CENTER
KAUFFMAN, DAVE	ADVISOR	BIOLOGICAL STATISTICIAN	UNCOMPAHGRE BASIN RESOURCE AREA	COLORADO
KELLER, RAY	ADVISOR	MONITORING SPECIALIST	ROSWELL RESOURCE AREA	NEW MEXICO
LOFGREN, EVERETT	ADVISOR	RANGE SPECIALIST	BURNS DISTRICT	OREGON
RYAN, NANCY	ADVISOR	RANGE SPECIALIST	LAKEVIEW DISTRICT	OREGON
SANDBERG, BOB	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	VERMILLION RESOURCE AREA	ARIZONA
SMITH, TERRY	ADVISOR	RANGE CONSERVATIONIST	CALIENTE RESOURCE AREA	NEVADA
VINCENT, DWAIN	ADVISOR	MONITORING SPECIALIST	RIO PUERCO RESOURCE AREA	NEW MEXICO
WEST, BUCK	ADVISOR	RANGE CONSERVATIONIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTE

** *INFORMATION/EDUCATION*

DANNA, TONY	CHAIRMAN	MONITORING SPECIALIST	COLORADO STATE OFFICE (933)	COLORADO
STAGER, BOB	CO-CHAIRMAN	MONITORING SPECIALIST	NEVADA STATE OFFICE (931)	NEVADA
PETERSON, WILLY	COORDINATOR	RANGE CONSERVATIONIST	DIVISION OF RANGELAND RESOURCES	WASHINGTON OFFIC
ADAMS, STAN	MEMBER	LEAD RANGE CONSERVATIONIST	HENRY MOUNTAIN RESOURCE AREA	UTAH
ALEXANDER, BOB	MEMBER	AREA MANAGER	WHITE SANDS RESOURCE AREA	NEW MEXICO
FAHLGREN, JOHN	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	VALLEY RESOURCE AREA	MONTANA
AMEN, AL	ADVISOR	SOIL SCIENTIST	DIVISION OF RESOURCES (D471)	DENVER SERVICE
BUTZIER, STAN	ADVISOR	DEPUTY STATE DIRECTOR- L & R R	OREGON STATE OFFICE (930)	OREGON
CLARK, RON	ADVISOR	BRANCH CHIEF- PHYSICAL RESOURCES	DIVISION OF RESOURCES (D471)	DENVER SERVICE
CORDELL, ROBERT	ADVISOR	AREA MANAGER	BENNETT HILLS RESOURCE AREA	IDAHO
COSTELLO, TERRY	ADVISOR	AREA MANAGER	SNAKE RIVER RESOURCE AREA	IDAHO
CROPPER, GEORGE	ADVISOR	AREA MANAGER	SHIVWITS RESOURCE AREA	ARIZONA
DAHLEN, CHARLIE	ADVISOR	AREA MANAGER	CARLSBAD RESOURCE AREA	NEW MEXICO
DAWSON, BRUCE	ADVISOR	RANGE SPECIALIST	UKIAH DISTRICT	CALIFORNIA
DREIER, GARY	ADVISOR	RANGE TRAINING COORDINATOR	PHOENIX TRAINING CENTER (960)	ARIZONA
FINDLEY, JEAN	ADVISOR	RANGE CONSERVATIONIST	NORTHERN MALHEUR RESOURCE AREA	OREGON
FRANDSEN, O DELL	ADVISOR	DEPUTY STATE DIRECTOR- L & R P	UTAH STATE OFFICE (930)	UTAH
HANNAN, STEVE	ADVISOR	RANGE CONSERVATIONIST	BUFFALO RESOURCE AREA	WYOMING
HARDY, ROD	ADVISOR	DISTRICT VEGETATION SPECIALIST	ROCK SPRINGS DISTRICT	WYOMING
KENNEDY, BUZ	ADVISOR	BRANCH CHIEF-BIOLOGICAL RESOURCES	CALIFORNIA STATE OFFICE (932)	CALIFORNIA
LIGON, GENE	ADVISOR	LEAD RANGE CONSERVATIONIST	GLENWOOD SPRINGS RESOURCE AREA	COLORADO
MONINI, JACK	ADVISOR	RANGE CONSERVATIONIST	WASHAKIE RESOURCE AREA	WYOMING

** MONITORING POLICY

JENSEN, JENS	CHAIRMAN	BRANCH CHIEF-BIOLOGICAL RESOURCES	UTAH STATE OFFICE (932)	UTAH
TOWNSEND, JERRY	CO-CHAIRMAN	RANGE SPECIALIST	NEW MEXICO STATE OFFICE (931)	NEW MEXICO
GISH, MARK	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	BISHOP RESOURCE AREA	CALIFORNIA
HANCOCK, JIM	MEMBER	DISTRICT MANAGER	PRINEVILLE DISTRICT	OREGON
ROSEBERRY, PHYLLIS	MEMBER	AREA MANAGER	GRASS CREEK RESOURCE AREA	WYOMING
SCALEY, FRED	MEMBER	RANGE SPECIALIST	BOISE DISTRICT	IDAHO
ARRASMITH, PAUL	ADVISOR	DISTRICT MANAGER	MONTROSE DISTRICT OFFICE	COLORADO
BACON, CHAD	ADVISOR	SECTION CHIEF- RANGELAND	OREGON STATE OFFICE (932)	OREGON
GRIGGS, DAVE	ADVISOR	AREA MANAGER	PARADISE-DENIO RESOURCE AREA	NEVADA
HOLBROOK, BUD	ADVISOR	AREA MANAGER	DIVIDE RESOURCE AREA	WYOMING
HUMPHREY, LARRY	ADVISOR	NATURAL RESOURCE SPECIALIST	SAFFORD DISTRICT	ARIZONA
KINCH, GENE	ADVISOR	RANGE SPECIALIST	GRAND JUNCTION DISTRICT	COLORADO
MOORE, BOB	ADVISOR	SERVICE CENTER DIRECTOR	DENVER SERVICE CENTER (D100)	DENVER SERVICE CENTER
MORCK, NEIL	ADVISOR	STATE DIRECTOR	COLORADO STATE OFFICE (910)	COLORADO
MORGAN, LARRY	ADVISOR	RANGE SPECIALIST	CALIFORNIA DESERT DISTRICT	CALIFORNIA
ODEN, HILLARY	ADVISOR	STATE DIRECTOR	WYOMING STATE OFFICE (910)	WYOMING
RANEY, GEORGE	ADVISOR	RANGE SPECIALIST	ARIZONA STATE OFFICE (932)	ARIZONA
ROBISON, ROLAND	ADVISOR	STATE DIRECTOR	UTAH STATE OFFICE (910)	UTAH
SCHWABEL, RICK	ADVISOR	RANGE SPECIALIST	BUTTE DISTRICT	MONTANA
SMITH, JERRY	ADVISOR	AREA MANAGER	SCHELL RESOURCE AREA	NEVADA
TAYLOR, VERN	ADVISOR	SUPERVISORY RANGE CONSERVATIONIST	POWDER RIVER RESOURCE AREA	MONTANA
VAIL, DELMAR	ADVISOR	STATE DIRECTOR	IDAHO STATE OFFICE (910)	IDAHO

** TECHNICAL ISSUES

WILLOUGHBY, JOHN	CHAIRMAN	RANGE SPECIALIST	CALIFORNIA STATE OFFICE (932)	CALIFORNIA
MAXFIELD, LARRY	CO-CHAIRMAN	MONITORING SPECIALIST	UTAH STATE OFFICE (932)	UTAH
VANDAN, BILL	MEMBER	SUPERVISORY RANGE CONSERVATIONIST	GILA RESOURCE AREA	ARIZONA
MAGGIO, RICHARD	MEMBER	RANGE CONSERVATIONIST	BIG BUTTE RESOURCE AREA	IDAHO
RUMPEL, PHIL	MEMBER	RANGE SPECIALIST	VALE DISTRICT	OREGON
WARREN, ANDY	MEMBER	RANGE CONSERVATIONIST	DIVIDE RESOURCE AREA	WYOMING
FERDINAND, DUANE	ADVISOR	RANGE SPECIALIST	LEWISTOWN DISTRICT	MONTANA
HUBBARD, RICH	ADVISOR	RANGE SPECIALIST	SPOKANE DISTRICT	OREGON
HUGHES, LEE	ADVISOR	RANGE SPECIALIST	ARIZONA STRIP DISTRICT	ARIZONA
LEBARRON, BILL	ADVISOR	AREA MANAGER	GREEN RIVER RESOURCE AREA	WYOMING
OLDROYD, LARRY	ADVISOR	ASSOCIATE DISTRICT MANAGER	RICHFIELD DISTRICT	UTAH
POGACNIK, TOM	ADVISOR	RANGE CONSERVATIONIST	TONOPAH RESOURCE AREA	NEVADA
PULFORD, BILL	ADVISOR	DISTRICT MANAGER	CRAIG DISTRICT	COLORADO
REED, TERRY	ADVISOR	AREA MANAGER	GUNNISON BASIN RESOURCE AREA	COLORADO
SALT, TIM	ADVISOR	AREA MANAGER	LAS CRUCES/LORDSBURG RESOURCE AREA	NEW MEXICO
SINGLETON, ED	ADVISOR	MONITORING SPECIALIST	CARLSBAD RESOURCE AREA	NEW MEXICO
SMITH, HARLAN	ADVISOR	AREA MANAGER	SOCORRO RESOURCE AREA	NEW MEXICO
UCHIDA, ALAN	ADVISOR	RANGE CONSERVATIONIST	ALTURAS RESOURCE AREA	CALIFORNIA
VOSLER, CHRIS	ADVISOR	DEPUTY STATE DIRECTOR- L & R R	WYOMING STATE OFFICE (930)	WYOMING
WAGNER, BILL	ADVISOR	NATURAL RESOURCE SPECIALIST	UTAH STATE OFFICE (932)	UTAH

** WORKSHOP GUEST

BRYANT, DAVE	SPEAKER	DEPARTMENT HEAD	UNIVERSITY OF IDAHO
BURKHARDT, WAYNE	SPEAKER	PROFESSOR	UNIVERSITY OF NEVADA-RENO
BUSBY, F. E.	SPEAKER	PRESIDENT	SOCIETY FOR RANGE MANAGEMENT
EPPERS, BUD	SPEAKER	V.P. PUBLIC LANDS COUNCIL	NATIONAL CATTLEMANS ASSOCIATION
JACKSON, PETE	MODERATOR	EXECUTIVE VICE-PRESIDENT	SOCIETY FOR RANGE MANAGEMENT
JOHNSON, KENDALL	SPEAKER	EXTENSION RANGE SPECIALIST	DEPARTMENT OF RANGE SCIENCES
LAYCOCK, BILL	SPEAKER	DEPARTMENT HEAD	UNIVERSITY OF WYOMING
LOPER, DICK	VISITOR	RANGE CONSULTANT	WESTERN RANGE CONSULTANTS ASSOC.
MC DONALD, PATTY	VISITOR	EXECUTIVE DIRECTOR	NATIONAL CATTLEMANS ASSOCIATION

SHARPE, MAITLAND	SPEAKER	ASSOCIATE EXECUTIVE DIRECTOR	IZAAK WALTON LEAGUE OF AMERICA	
SMITH, LAMAR	SPEAKER	DEPARTMENT HEAD	UNIVERSITY OF ARIZONA	

** WORKSHOP STAFF

BUCHANAN, CARL	VIDEO	EMPLOYEE DEVELOPMENT SPECIALIST	PERSONNEL (D530)	DENVER SERVICE CENTER
CRISCO, WALLY	POSTERS	NATURAL RESOURCE SPECIALIST	DIVISION OF RESOURCES (D473)	DENVER SERVICE CENTER
DORAN, PETER	GRAPHICS	TECHNICAL ILLUSTRATOR	TECHNOLOGY TRANSFER STAFF (D140)	DENVER SERVICE CENTER
ELLIOTT, PHYLLIS	ADP	COMPUTER ASSISTANT	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
IRELAND, BOB	VIDEO	AUDIO/VISUAL INFO SPECIALIST	TECHNOLOGY TRANSFER STAFF (D140)	DENVER SERVICE CENTER
STUART, [illegible]	VIDEO	TECHNICAL INFORMATION SPECIALIST	TECHNOLOGY TRANSFER STAFF (D140)	DENVER SERVICE CENTER
TRUJILLO, MARGE	REGISTRAR	SECRETARY	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER

** WORKSHOP VISITOR

ARCHER, PAT	VISITOR	CHIEF-PUBLIC AFFAIRS	COLORADO STATE OFFICE (912)	COLORADO
ARCHER, SCOTT	VISITOR	AIR QUALITY SPECIALIST	COLORADO STATE OFFICE (933)	COLORADO
BAKER, JOHN	VISITOR	CHIEF-DIVISON OF RESOURCES	DIVISION OF RESOURCES (D470)	DENVER SERVICE CENTER
BALLANTYNE, KURT	VISITOR	WILDLIFE BIOLOGIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
BATSON, FRED	VISITOR	BRANCH CHIEF-REMOTE SENSING	DIVISION OF RESOURCES (D473)	DENVER SERVICE CENTER
BOYD, RAY	VISITOR	WILDLIFE BIOLOGIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
BOYER, CHARLIE	VISITOR	RANGE CONSERVATIONIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
COLLOTZI, AL	VISITOR	FISHERIES BIOLOGIST	U.S.F.S. REGION II	
COOPERRIDER, ALLEN	VISITOR	WILDLIFE BIOLOGIST	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
FREE, JIM	VISITOR	RANGE STAFF	U.S.F.S. REGION II	
GAYLORD, MARY	VISITOR	STAFF CHIEF-TECHNOLOGY TRANSFER	TECHNOLOGY TRANSFER STAFF (D140)	DENVER SERVICE CENTER
GEDDIS, BONNI	VISITOR	COMPUTER ASSISTANT	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
HARMAN, JERRY	VISITOR	SOIL SCIENTIST	COLORADO STATE OFFICE (933)	COLORADO
HETZEL, GLEN	VISITOR	DIRECTOR RANGE,WILDLIFE,FISHERIES	U.S.F.S. REGION II	
HUDSON, SHIRLEY	VISITOR	STATISTICIAN	DIVISION OF RESOURCES (D471)	DENVER SERVICE CENTER
JANES, ERIC	VISITOR	HYDROLOGIST	DIVISION OF RESOURCES (D471)	DENVER SERVICE CENTER
LEISHMAN, DOUG	EXHIBITOR	REGIONAL SALES MANAGER	OMNIDATA INTERNATIONAL	
MARTINEZ, TONY	VISITOR	WATER LAW COORDINATOR	COLORADO STATE OFFICE (933)	COLORADO
MIESZUS, ABE	VISITOR	CHIEF DIVISION OF RESOURCES	CANON CITY DISTRICT	COLORADO
POTTER, VAL	EXHIBITOR	SALES MANAGER	OMNIDATA INTERNATIONAL	
PRIBBLE, JIM	VISITOR	FORESTER	COLORADO STATE OFFICE (933)	COLORADO
ROBERTS, CECIL	VISITOR	DEPUTY STATE DIRECTOR- L & R R	COLORADO STATE OFFICE (930)	COLORADO
SPARKS, DONNIE	VISITOR	DISTRICT MANAGER	CANON CITY DISTRICT	COLORADO
STEPANIK, DEAN	VISITOR	STATE DIRECTOR	MONTANA STATE OFFICE (910)	MONTANA
STROBEL, ALLAN	VISITOR	BRANCH CHIEF-BIOLOGICAL RESOURCES	DIVISION OF RESOURCES (D472)	DENVER SERVICE CENTER
VANDASS, STEVE	VISITOR	HYDROLOGIST	COLORADO STATE OFFICE (933)	COLORADO
WHITTEKIEND, CRAIG	VISITOR	RANGE STAFF	U.S.F.S. REGION II	
WORK, ED	VISITOR	PHYSICAL SCIENTIST	BRANCH OF REMOTE SENSING (D473)	DENVER SERVICE CENTER

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Appendix C
Roster Of Attendees

NAME	WORK GROUP	OFFICE	CITY, STATE	PHONE	FTS
ADAMS, STAN	INFORMATION/EDUCATION	HENRY MOUNTAIN RESOURCE AREA	HANKSVILLE, UT	(801) 896-8221	FTS NONE
ALEXANDER, BOB	INFORMATION/EDUCATION	WHITE SANDS RESOURCE AREA	LAS CRUCES, NM	(505) 525-1171	FTS 571-8312
AMEN, AL	INFORMATION/EDUCATION	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0153	FTS 776-9863
ANDERSON, ANDY	HANDLING MONITORING DATA	CARSON CITY DISTRICT	CARSON CITY, NV	(702) 882-1631	FTS 470-6100
ANDERSON, GLADE	HANDLING MONITORING DATA	SALT LAKE CITY DISTRICT	SALT LAKE CITY, UT	(801) 524-6761	FTS 588-6761
ARCHER, PAT	WORKSHOP VISITOR	COLORADO STATE OFFICE (912)	LAKEWOOD, CO	(303) 236-1700	FTS 776-1700
ARCHER, SCOTT	WORKSHOP VISITOR	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
ARRASMITH, PAUL	MONITORING POLICY	MONTROSE DISTRICT OFFICE	MONTROSE, CO	(303) 249-7791	FTS 322-7300
BACON, CHAD	MONITORING POLICY	OREGON STATE OFFICE (932)	PORTLAND, OR	(503) 231-6862	FTS 429-6862
BAKER, JOHN	WORKSHOP VISITOR	DIVISION OF RESOURCES (D470)	DENVER, CO	(303) 236-0170	FTS 776-0170
BALLANTYNE, KURT	WORKSHOP VISITOR	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0142	FTS 776-0142
BATSON, FRED	WORKSHOP VISITOR	DIVISION OF RESOURCES (D473)	DENVER, CO	(303) 236-6376	FTS 776-6376
BENNETT, E LYNN	ALL WORK GROUPS	LAND & RENEWABLE RESOURCES (200)	WASHINGTON, DC	(202) 343-4896	FTS 343-4896
BIRCH, TOM	CORRELATION TO INVENTORY	LAS CRUCES DISTRICT	LAS CRUCES, NM	(505) 525-1171	FTS 571-8312
BLINCOW, GARY	CORRELATION TO PLANNING	WORLAND DISTRICT	WORLAND, WY	(307) 347-9871	FTS NONE
BLYMYER, MIKE	CORRELATION TO INVENTORY	MONTROSE DISTRICT	MONTROSE, CO	(303) 249-7791	FTS 322-7300
BOYD, RAY	WORKSHOP VISITOR	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-6310	FTS 776-6310
BOYER, CHARLIE	WORKSHOP VISITOR	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0157	FTS 776-0157
BRANDAU, BILL	TECHNICAL ISSUES	GILA RESOURCE AREA	SAFFORD, AZ	(602) 428-4040	FTS 762-6384
BRUBAKER, DALE	CORRELATION TO INVENTORY	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
BRYANT, DAVE	WORKSHOP GUEST	UNIVERSITY OF IDAHO	MOSCOW, ID	(208) 884-6441	FTS NONE
BUCHANAN, CARL	WORKSHOP STAFF	PERSONNEL (D530)	DENVER, CO	(303) 236-6402	FTS 776-6402
BURKE, TIM	HANDLING MONITORING DATA	BAKERSFIELD DISTRICT	BAKERSFIELD, CA	(805) 861-4191	FTS 961-4191
BURKHARDT, WAYNE	WORKSHOP GUEST	UNIVERSITY OF NEVADA-RENO	RENO, NV	(702) 784-6763	FTS NONE
BUSBY, F. E.	WORKSHOP GUEST	SOCIETY FOR RANGE MANAGEMENT	LARAMIE, WY	(307) 766-5124	FTS NONE
BUTZER, STAN	INFORMATION/EDUCATION	OREGON STATE OFFICE (930)	PORTLAND, OR	(503) 231-6835	FTS 429-6835
CAIN, DON	CORRELATION TO INVENTORY	BURNS DISTRICT	BURNS, OR	(503) 573-5241	FTS NONE
CLARK, RON	INFORMATION/EDUCATION	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0154	FTS 776-0154
COLLOTZI, AL	WORKSHOP VISITOR	U.S.F.S. REGION II	DENVER, CO	(303) 236-9536	FTS 776-9536
COLOFF, STAN	CORRELATION TO PLANNING	BRANCH OF SOIL, AIR, & WATER	WASHINGTON, DC	(202) 653-9210	FTS 653-9210
CONN, KEMP	HANDLING MONITORING DATA	UTAH STATE OFFICE (910)	SALT LAKE CITY, UT	(801) 524-5311	FTS 588-5311
COOPERRIDER, ALLEN	WORKSHOP VISITOR	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0161	FTS 776-0161
CORDELL, ROBERT	INFORMATION/EDUCATION	BENNETT HILLS RESOURCE AREA	SHOSHONE, ID	(208) 886-2208	FTS 554-6576
COSTELLO, TERRY	INFORMATION/EDUCATION	SNAKE RIVER RESOURCE AREA	BURLEY, ID	(208) 678-5514	FTS 554-6641
CRISCO, WALLY	WORKSHOP STAFF	DIVISION OF RESOURCES (D473)	DENVER, CO	(303) 985-0290	FTS 776-6379
CROCKETT, BOB	CORRELATION TO PLANNING	LAS CRUCES/LORDSBURG RESOURCE AREA	LAS CRUCES, NM	(505) 525-1171	FTS 571-8312
CROPPER, GEORGE	INFORMATION/EDUCATION	SHIVWITS RESOURCE AREA	ST. GEORGE, UT	(801) 628-4491	FTS NONE
DAHLEM, CHARLIE	INFORMATION/EDUCATION	CARLSBAD RESOURCE AREA	CARLSBAD, NM	(505) 887-6544	FTS NONE
DAMMA, TONY	INFORMATION/EDUCATION	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
DAUGHTON, BRUCE	HANDLING MONITORING DATA	CASPER DISTRICT	CASPER, WY	(307) 261-5101	FTS 328-5101
DAWSON, BRUCE	INFORMATION/EDUCATION	UKIAH DISTRICT	UKIAH, CA	(707) 462-3873	FTS NONE
DELANEY, LEE	HANDLING MONITORING DATA	SURPRISE RESOURCE AREA	CEDARVILLE, CA	(916) 279-6101	FTS NONE
DEMMER, JOHN	CORRELATION TO PLANNING	CRAIG DISTRICT	CRAIG, CO	(303) 824-8261	FTS NONE
DORAN, PETER	WORKSHOP STAFF	TECHNOLOGY TRANSFER STAFF (D140)	DENVER, CO	(303) 236-6409	FTS 776-6409
DREIER, GARY	INFORMATION/EDUCATION	PHOENIX TRAINING CENTER (960)	PHOENIX, AZ	(602) 241-2651	FTS 261-2651
ELLIOTT, PHYLLIS	WORKSHOP STAFF	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0163	FTS 776-0163
EPPERS, BUD	WORKSHOP GUEST	NATIONAL CATTLEMANS ASSOCIATION	ROSWELL, NM	(505) 622-0055	FTS NONE

ESHELMAN, KRIS	**ALL WORK GROUPS**	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0165	FTS 776-0165
FAHLGREN, JOHN	**INFORMATION/EDUCATION**	VALLEY RESOURCE AREA	GLASGLOW, MT	(406) 228-4316	FTS*585-5011
FERDINAND, DUANE	**TECHNICAL ISSUES**	LEWISTOWN DISTRICT	LEWISTOWN, MT	(406) 538-7461	FTS*585-5011
FIELD, LARRY	**HANDLING MONITORING DATA**	KOBUK DISTRICT	FAIRBANKS, AK	(907) 356-5379	FTS NONE
FINDLEY, JEAN	**INFORMATION/EDUCATION**	NORTHERN MALHEUR RESOURCE AREA	VALE, OR	(503) 473-3144	FTS 554-6244
FOSTER, JOHN	**HANDLING MONITORING DATA**	ALMRS/GIS (D150)	DENVER, CO	(303) 236-0100	FTS 776-0100
FRANDSEN, O DELL	**INFORMATION/EDUCATION**	UTAH STATE OFFICE (930)	SALT LAKE CITY, UT	(801) 524-3145	FTS 588-3145
FREE, JIM	**WORKSHOP VISITOR**	U.S.F.S. REGION II	DENVER, CO	(303) 236-9533	FTS 776-9533
GAYLORD, MARY	**WORKSHOP VISITOR**	TECHNOLOGY TRANSFER STAFF (D140)	DENVER, CO	(303) 236-6406	FTS 776-6406
GEROIS, BERNI	**WORKSHOP VISITOR**	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0160	FTS 776-0160
GISH, MARK	**MONITORING POLICY**	BISHOP RESOURCE AREA	BISHOP, CA	(619) 872-4881	FTS NONE
GLENN, DON	**HANDLING MONITORING DATA**	RAWLINS DISTRICT	RAWLINS, WY	(307) 324-7171	FTS 328-3011
GRIGGS, DAVE	**MONITORING POLICY**	PARADISE-DENIO RESOURCE AREA	WINNEMUCCA, NV	(702) 623-3676	FTS NONE
HALVERSON, RON	**CORRELATION TO INVENTORY**	PRINEVILLE DISTRICT	PRINEVILLE, OR	(503) 447-4115	FTS NONE
HAMILTON, CAROLE	**CORRELATION TO INVENTORY**	ARIZONA STATE OFFICE (932)	PHOENIX, AZ	(602) 241-5512	FTS 261-5512
HANCOCK, JIM	**MONITORING POLICY**	PRINEVILLE DISTRICT	PRINEVILLE, OR	(503) 447-4115	FTS NONE
HANNAN, STEVE	**INFORMATION/EDUCATION**	BUFFALO RESOURCE AREA	BUFFALO, WY	(307) 684-5586	FTS NONE
HARBOUR, GRANT	**HANDLING MONITORING DATA**	SALMON DISTRICT	SALMON, ID	(208) 756-2201	FTS NONE
HARDY, ROD	**INFORMATION/EDUCATION**	ROCK SPRINGS DISTRICT	ROCK SPRINGS, WY	(307) 382-5350	FTS 328-6011
HARMAN, JERRY	**WORKSHOP VISITOR**	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
HENDERSON, DAVE	**CORRELATION TO INVENTORY**	KEMMERER RESOURCE AREA	KEMMERER, WY	(307) 877-3933	FTS NONE
HENKE, STEVE	**CORRELATION TO PLANNING**	FARMINGTON RESOURCE AREA	FARMINGTON, NM	(505) 325-3581	FTS 572-6220
HETZEL, GLEN	**WORKSHOP VISITOR**	U.S.F.S. REGION II	DENVER, CO	(303) 236-9526	FTS 776-9526
HIGGINS, LEE	**CORRELATION TO PLANNING**	LOWER GILA RESOURCE AREA	PHOENIX, AZ	(602) 863-4464	FTS 764-0501
HINES, BRAD	**CORRELATION TO PLANNING**	NEVADA STATE OFFICE (931)	RENO, NV	(702) 784-5455	FTS 470-5455
HOLBROOK, BUD	**MONITORING POLICY**	DIVIDE RESOURCE AREA	RAWLINS, WY	(307) 324-4841	FTS NONE
HUBBARD, RICH	**TECHNICAL ISSUES**	SPOKANE DISTRICT	SPOKANE, WA	(509) 456-2570	FTS 439-2570
HUDSON, SHIRLEY	**WORKSHOP VISITOR**	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0148	FTS 776-0148
HUGHES, LEE	**TECHNICAL ISSUES**	ARIZONA STRIP DISTRICT	ST. GEORGE, UT	(801) 673-3545	FTS NONE
HUMPHREY, LARRY	**MONITORING POLICY**	SAFFORD DISTRICT	SAFFORD, AZ	(602) 428-4040	FTS 762-6384
IRELAND, ROB	**WORKSHOP STAFF**	TECHNOLOGY TRANSFER STAFF (D140)	DENVER, CO	(303) 236-6406	FTS 776-6406
JACKSON, PETE	**WORKSHOP GUEST**	SOCIETY FOR RANGE MANAGEMENT	DENVER, CO	(303) 571-0174	FTS NONE
JAKUBOWSKI, JAKE	**HANDLING MONITORING DATA**	CANON CITY DISTRICT	CANON CITY, CO	(303) 275-0631	FTS NONE
JAMES, ERIC	**WORKSHOP VISITOR**	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0147	FTS 776-0147
JENSEN, ARLEN	**HANDLING MONITORING DATA**	CEDAR CITY DISTRICT	CEDAR CITY, UT	(801) 586-2401	FTS NONE
JENSEN, JERR	**MONITORING POLICY**	UTAH STATE OFFICE (932)	SALT LAKE CITY, UT	(801) 524-3124	FTS 588-3124
JOHNSON, KENDALL	**WORKSHOP GUEST**	DEPARTMENT OF RANGE SCIENCES	LOGAN, UT	(801) 750-2472	FTS NONE
KATHMAN, DAVE	**HANDLING MONITORING DATA**	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0145	FTS 776-0145
KAUFFMAN, DAVE	**HANDLING MONITORING DATA**	UNCOMPAHGRE BASIN RESOURCE AREA	MONTROSE, CO	(303) 249-2244	FTS NONE
KELLER, RAY	**HANDLING MONITORING DATA**	ROSWELL RESOURCE AREA	ROSWELL, NM	(505) 622-9042	FTS 476-0272
KENNEDY, BUZ	**INFORMATION/EDUCATION**	CALIFORNIA STATE OFFICE (932)	SACRAMENTO, CA	(916) 978-4725	FTS 460-4725
KINCH, GENE	**MONITORING POLICY**	GRAND JUNCTION DISTRICT	GRAND JUNCTION, CO	(303) 243-6552	FTS 323-0233
KWIATKOWSKI, JOHN	**CORRELATION TO INVENTORY**	MONTANA STATE OFFICE (930)	BILLINGS, MT	(406) 657-6474	FTS 585-6474
LAYCOCK, BILL	**WORKSHOP GUEST**	UNIVERSITY OF WYOMING	LARAMIE, WY	(307) 766-2263	FTS NONE
LEBARRON, BILL	**TECHNICAL ISSUES**	GREEN RIVER RESOURCE AREA	ROCK SPRINGS, WY	(307) 362-6422	FTS NONE
LEISHMAN, DOUG	**WORKSHOP VISITOR**	OMNIDATA INTERNATIONAL	LOGAN, UT	(801) 753-7760	FTS NONE
LEONARD, STEVE	**CORRELATION TO INVENTORY**	NATIONAL SOIL-RANGE TEAM	RENO, NV	(702) 784-5576	FTS 470-5576
LIGON, GENE	**INFORMATION/EDUCATION**	GLENWOOD SPRINGS RESOURCE AREA	GLENWOOD SPRINGS, CO	(303) 945-2341	FTS NONE
LIKINS, JOHN	**CORRELATION TO INVENTORY**	LANDER RESOURCE AREA	LANDER, WY	(307) 332-7822	FTS 328-3307
LINDSEY, KATHY	**CORRELATION TO INVENTORY**	ELY DISTRICT	ELY, NV	(702) 289-4865	FTS NONE
LODZINSKI, DAVID	**CORRELATION TO PLANNING**	VALE DISTRICT	VALE, OR	(503) 473-3144	FTS 554-6244
LOFGREN, EVERETT	**HANDLING MONITORING DATA**	BURNS DISTRICT	BURNS, OR	(503) 573-5241	FTS NONE
LOPER, DICK	**WORKSHOP GUEST**	WESTERN RANGE CONSULTANTS ASSOC.	LANDER, WY	(307) 332-2601	FTS NONE
MAGGIO, RICHARD	**TECHNICAL ISSUES**	BIG BUTTE RESOURCE AREA	IDAHO FALLS, ID	(208) 529-1020	FTS 554-6341
MARTINEZ, TONY	**WORKSHOP VISITOR**	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762

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MARY, DOUG	CORRELATION TO PLANNING	WELLS RESOURCE AREA	ELKO, NV	(702) 738-4071	FTS NONE
MAYFIELD, LARRY	TECHNICAL ISSUES	UTAH STATE OFFICE (932)	SALT LAKE CITY, UT	(801) 524-3119	FTS 588-3119
MC CLURE, BEAUMONT	CORRELATION TO INVENTORY	ARIZONA STATE OFFICE (930)	PHOENIX, AZ	(602) 241-5515	FTS 261-5515
MC CRAE, TED	CORRELATION TO PLANNING	SAN SIMON RESOURCE AREA	SAFFORD, AZ	(602) 428-4040	FTS 762-6384
MC DONALD, PATTY	WORKSHOP GUEST	NATIONAL CATTLEMANS ASSOCIATION	WASHINGTON, DC	(202) 347-0228	FTS NONE
MELTON, JIM	CORRELATION TO PLANNING	PLATTE RIVER RESOURCE AREA	CASPER, WY	(307) 261-5191	FTS 328-5191
MILES, RAY	CORRELATION TO INVENTORY	NATIONAL SOIL-RANGE TEAM	RENO, NV	(702) 784-5579	FTS 470-5579
MITCHELL, BOB	CORRELATION TO INVENTORY	IDAHO STATE OFFICE (931)	BOISE, ID	(208) 334-1553	FTS 554-1553
MORONI, JACK	INFORMATION/EDUCATION	WASHAKIE RESOURCE AREA	WORLAND, WY	(307) 347-9871	FTS NONE
MOORE, BOB	MONITORING POLICY	DENVER SERVICE CENTER (D100)	DENVER, CO	(303) 236-6452	FTS 776-6452
MORCK, NEIL	MONITORING POLICY	COLORADO STATE OFFICE (910)	LAKEWOOD, CO	(303) 236-1721	FTS 776-1721
MORGAN, LARRY	MONITORING POLICY	CALIFORNIA DESERT DISTRICT	RIVERSIDE, CA	(714) 351-6386	FTS 796-6386
[illegible], ADE	WORKSHOP VISITOR	CANON CITY DISTRICT	CANON CITY, CO	(303) 275-0631	FTS NONE
ODEN, HILLARY	MONITORING POLICY	WYOMING STATE OFFICE (910)	CHEYENNE, WY	(307) 772-2326	FTS 328-2326
OLDROYD, LARRY	TECHNICAL ISSUES	RICHFIELD DISTRICT	RICHFIELD, UT	(801) 896-8221	FTS 584-8011
PACK, LEON	HANDLING MONITORING DATA	MILES CITY DISTRICT	MILES CITY, MT	(406) 232-4331	FTS#585-5011
PETERSON, WILLY	INFORMATION/EDUCATION	DIVISION OF RANGELAND RESOURCES	WASHINGTON, DC	(202) 653-9210	FTS 653-9210
PHILLIPS, BILL	CORRELATION TO PLANNING	SUSANVILLE DISTRICT	SUSANVILLE, CA	(916) 257-5381	FTS NONE
PIZEL, ROBERT	CORRELATION TO PLANNING	DIVISION OF PLANNING	WASHINGTON, DC	(202) 653-9202	FTS 653-8824
POGACNIK, TOM	TECHNICAL ISSUES	TONOPAH RESOURCE AREA	TONOPAH, NV	(702) 482-6214	FTS NONE
POTTER, VAL	WORKSHOP VISITOR	OMNIDATA INTERNATIONAL	LOGAN, UT	(801) 753-7760	FTS NONE
PRIBBLE, JIM	WORKSHOP VISITOR	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
PULFORD, BILL	TECHNICAL ISSUES	CRAIG DISTRICT	CRAIG, CO	(303) 824-8261	FTS NONE
RAMEY, GEORGE	MONITORING POLICY	ARIZONA STATE OFFICE (932)	PHOENIX, AZ	(602) 241-5512	FTS 261-5512
REED, TERRY	TECHNICAL ISSUES	GUNNISON BASIN RESOURCE AREA	GUNNISON, CO	(303) 641-0471	FTS NONE
RIETZ, JACK	CORRELATION TO INVENTORY	SAFFORD DISTRICT	SAFFORD, AZ	(602) 428-4040	FTS 762-6384
ROBERTS, CECIL	WORKSHOP VISITOR	COLORADO STATE OFFICE (930)	LAKEWOOD, CO	(303) 236-1748	FTS 776-1748
ROBISON, ROLAND	MONITORING POLICY	UTAH STATE OFFICE (910)	SALT LAKE CITY, UT	(801) 524-5311	FTS 588-5311
ROSENBERRY, PHYLLIS	MONITORING POLICY	GRASS CREEK RESOURCE AREA	WORLAND, WY	(307) 347-9871	FTS NONE
ROUNDY, ELDO	HANDLING MONITORING DATA	KINGMAN RESOURCE AREA	KINGMAN, AZ	(602) 757-3161	FTS NONE
RUPPEL, PHIL	TECHNICAL ISSUES	VALE DISTRICT	VALE, OR	(503) 473-3144	FTS 554-1700
RYAN, NANCY	HANDLING MONITORING DATA	LAKEVIEW DISTRICT	LAKEVIEW, OR	(503) 947-2177	FTS NONE
SALT, TIM	TECHNICAL ISSUES	LAS CRUCES/LORDSBURG RESOURCE AREA	LAS CRUCES, NM	(505) 525-1171	FTS 571-8312
SANDBERG, BOB	HANDLING MONITORING DATA	VERMILLION RESOURCE AREA	ST. GEORGE, UT	(801) 628-4491	FTS NONE
SAZAMA, JAMES	CORRELATION TO PLANNING	ROYAL GORGE RESOURCE AREA	CANON CITY, CO	(303) 275-7578	FTS NONE
SCHIVE, JOHN	CORRELATION TO INVENTORY	MOAB DISTRICT	MOAB, UT	(801) 259-6111	FTS NONE
SCHLEY, FRED	MONITORING POLICY	BOISE DISTRICT	BOISE, ID	(208) 334-1582	FTS 554-1582
SCHWABEL, RICK	MONITORING POLICY	BUTTE DISTRICT	BUTTE, MT	(406) 494-5059	FTS 585-5059
SECRIST, GLEN	ALL WORK GROUPS	DIVISION OF RANGELAND RESOURCES	WASHINGTON, DC	(202) 653-9195	FTS 653-9195
SHARPE, MAITLAND	WORKSHOP GUEST	IZAAK WALTON LEAGUE OF AMERICA	ARLINGTON, VA	(703) 528-1818	FTS NONE
SHORT, DARRELL	CORRELATION TO PLANNING	DIVISION OF PROGRAM EVALUATION	WASHINGTON, DC	(202) 653-8860	FTS 653-8860
SINGLETON, ED	TECHNICAL ISSUES	CARLSBAD RESOURCE AREA	CARLSBAD, NM	(505) 887-6544	FTS NONE
SMITH, HANK	ALL WORK GROUPS	LANDS & RENEWABLE RESOURCES	WASHINGTON, DC	(202) 343-4896	FTS 343-4896
SMITH, HARLAN	TECHNICAL ISSUES	SOCORRO RESOURCE AREA	SOCORRO, NM	(505) 835-0412	FTS NONE
SMITH, JERRY	MONITORING POLICY	SCHELL RESOURCE AREA	ELY, NV	(702) 289-4865	FTS NONE
SMITH, LAMAR	WORKSHOP GUEST	UNIVERSITY OF ARIZONA	TUCSON, AZ	(602) 621-3803	FTS NONE
SMITH, TERRY	HANDLING MONITORING DATA	CALIENTE RESOURCE AREA	CALIENTE, NV	(702) 726-3141	FTS NONE
SPARKS, DONNIE	WORKSHOP VISITOR	CANON CITY DISTRICT	CANON CITY, CO	(303) 275-0631	FTS NONE
SPARKS, KELLY	CORRELATION TO INVENTORY	LITTLE SNAKE RESOURCE AREA	CRAIG, CO	(303) 824-4441	FTS NONE
SPENCER, ELBERT	CORRELATION TO PLANNING	WYOMING STATE OFFICE (932)	CHEYENNE, WY	(307) 772-2076	FTS 328-2076
STAGER, BOB	INFORMATION/EDUCATION	NEVADA STATE OFFICE (931)	RENO, NV	(702) 784-5455	FTS 470-5455
STEPANEK, DEAN	WORKSHOP VISITOR	MONTANA STATE OFFICE (910)	BILLINGS, MT	(406) 657-6461	FTS 585-6461
STROBEL, ALLAN	WORKSHOP VISITOR	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0158	FTS 776-0158
STUART, DAVE	WORKSHOP STAFF	TECHNOLOGY TRANSFER STAFF (D140)	DENVER, CO	(303) 236-6407	FTS 776-6407
TAYLOR, JERRY	CORRELATION TO INVENTORY	BRUNEAU RESOURCE AREA	BOISE, ID	(208) 334-1582	FTS 554-1582

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TAYLOR, VERN	**MONITORING POLICY**	POWDER RIVER RESOURCE AREA	MILES CITY, MT	(406) 232-7000	FTS*585-5011
TEMPLETON, BILLY	**ALL WORK GROUPS**	DIVISION OF RANGELAND RESOURCES	WASHINGTON, DC	(202) 653-9193	FTS 653-9193
TIDWELL, DAVID	**ALL WORK GROUPS**	SPECIAL ASSISTANT TO THE DIRECTOR	WASHINGTON, DC	(202) 343-2701	FTS 343-2701
TIPPY, DAN	**CORRELATION TO INVENTORY**	HAVRE RESOURCE AREA	HAVRE, MT	(406) 265-5891	FTS*585-5011
TOWNSEND, JERRY	**MONITORING POLICY**	NEW MEXICO STATE OFFICE (931)	SANTA FE, NM	(505) 988-6231	FTS 476-6231
TRAASTAD, RON	**CORRELATION TO PLANNING**	DIAMOND MOUNTAIN RESOURCE AREA	VERNAL, UT	(801) 789-1362	FTS NONE
TRUJILLO, MARGE	**WORKSHOP STAFF**	DIVISION OF RESOURCES (D471)	DENVER, CO	(303) 236-0170	FTS 776-0170
URBINA, ALAN	**TECHNICAL ISSUES**	ALTURAS RESOURCE AREA	ALTURAS, CA	(916) 233-4666	FTS NONE
VAIL, DELMAR	**MONITORING POLICY**	IDAHO STATE OFFICE (910)	BOISE, ID	(208) 334-1401	FTS 554-1401
VANDASS, STEVE	**WORKSHOP VISITOR**	COLORADO STATE OFFICE (933)	LAKEWOOD, CO	(303) 236-1762	FTS 776-1762
VINCENT, DWAIN	**HANDLING MONITORING DATA**	RIO PUERCO RESOURCE AREA	ALBUQUERQUE, NM	(505) 761-4504	FTS 474-3114
VOLK, BILL	**CORRELATION TO PLANNING**	MONTANA STATE OFFICE (931)	BILLINGS, MT	(406) 657-6655	FTS 585-6655
VOSLER, CHRIS	**TECHNICAL ISSUES**	WYOMING STATE OFFICE (930)	CHEYENNE, WY	(307) 772-2425	FTS 328-2425
WAGNER, BILL	**TECHNICAL ISSUES**	UTAH STATE OFFICE (932)	SALT LAKE CITY, UT	(801) 524-3125	FTS 588-3125
WAGNER, BOB	**CORRELATION TO INVENTORY**	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0165	FTS 776-0165
WALKER, LARRY	**CORRELATION TO PLANNING**	OREGON STATE OFFICE (932)	PORTLAND, OR	(503) 231-6863	FTS 429-6863
WARREN, ANDY	**TECHNICAL ISSUES**	DIVIDE RESOURCE AREA	RAWLINS, WY	(307) 324-4841	FTS NONE
WEST, BUCK	**HANDLING MONITORING DATA**	DIVISION OF RESOURCES (D472)	DENVER, CO	(303) 236-0156	FTS 776-0156
WHITTEKIND, CRAIG	**WORKSHOP VISITOR**	U.S.F.S. REGION II	DENVER, CO	(303) 236-9537	FTS 776-9537
WILLOUGHBY, JOHN	**TECHNICAL ISSUES**	CALIFORNIA STATE OFFICE (932)	SACRAMENTO, CA	(916) 978-4725	FTS 460-4725
WORK, ED	**WORKSHOP VISITOR**	BRANCH OF REMOTE SENSING (D472)	DENVER, CO	(303) 236-6377	FTS 776-6377
WRIGHT, RICHARD	**CORRELATION TO PLANNING**	BURLEY DISTRICT	BURLEY, ID	(208) 678-5514	FTS 554-6641
ZIMMER, JOE	**CORRELATION TO PLANNING**	IDAHO STATE OFFICE (930)	BOISE, ID	(208) 334-1484	FTS 554-1484

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